



CHEETAL

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—Photo by S.P. Shahi



Wild Life Preservation Society of India

1. The aims and objects of the Society are as follows:—

- (a) To promote interest in and impart knowledge regarding the preservation and conservation of all forms of wild life, particularly among the youth of the country.
- (b) To co-operate with the Govts. of India and States and with other Societies and Institutions having similar aims and objects in working for the interests of wild life.
- (c) To assist in enforcing and actively supporting the Forest Acts, Wild Birds and Animals Protection Acts and Rules etc. of States and the Indian Arms Act and Rules in so far as they pertain to wild life and to bring to the notice of the authorities any infringement of the same and to assist in the detection and prosecution of offenders in respect of such laws.
- (d) To advise and help the Govt. and wild life administrators in the formation, maintenance and protection of Sanctuaries and National Parks, the preservation of wild life in general and rare species of India in particular and in the introduction of exotic species into the country, the rehabilitation of rare species etc. and in the revision on rational lines of the shooting and fishing rules, so as to conserve and increase wild life stocks.
- (e) To raise funds for the carrying out of the above aims and objects and to found and maintain museums, reading rooms and libraries of natural history in order to disseminate knowledge regarding wild life.
- (f) To promote sportsmanship in shikar and to recognise well regulated shooting and fishing, as a means of preserving wild life and fish so that through wise use the surplus may provide a recreational asset to the nation.
- (g) To carry out publicity and propaganda for the preservation of wild life in India by means of monographs, journals, films, film strips and other feasible methods.
- (h) To assist members of the Society in obtaining shooting and fishing facilities and facilities for viewing and photographing wild life in India.
- (i) To conduct research into the problem of Wild Life management in India, and in pursuance of this, to initiate, encourage and, where possible assist in projects for the study of threatened species and related subjects and to provide reference and research facilities for such work.
- (j) To carry on such other activities which will serve the above subjects.

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4. You will receive personal Identification and Membership card.
5. You will be entitled to buy all publications of the Society at a concessional rate.
6. You will be entitled to buy at concessional rates the Society's Greeting Cards, Calendars, Tie, Lapel badge and the Balance of Nature Game (specially Published in colour for its educative and recreational value).
7. You will be supplied "Cheetal", the quarterly journal of the Society free.

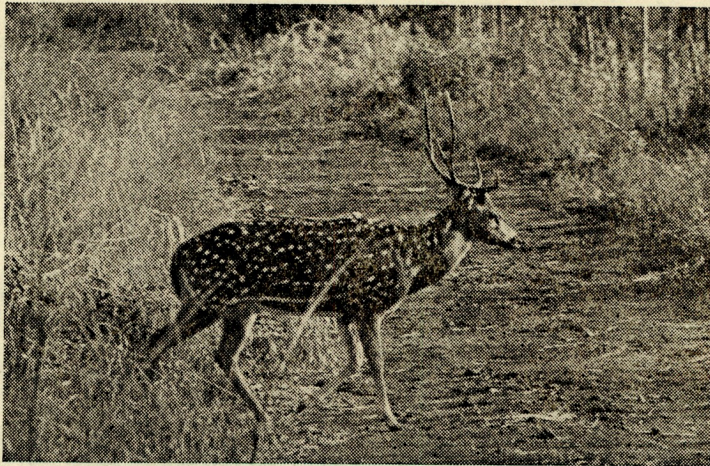
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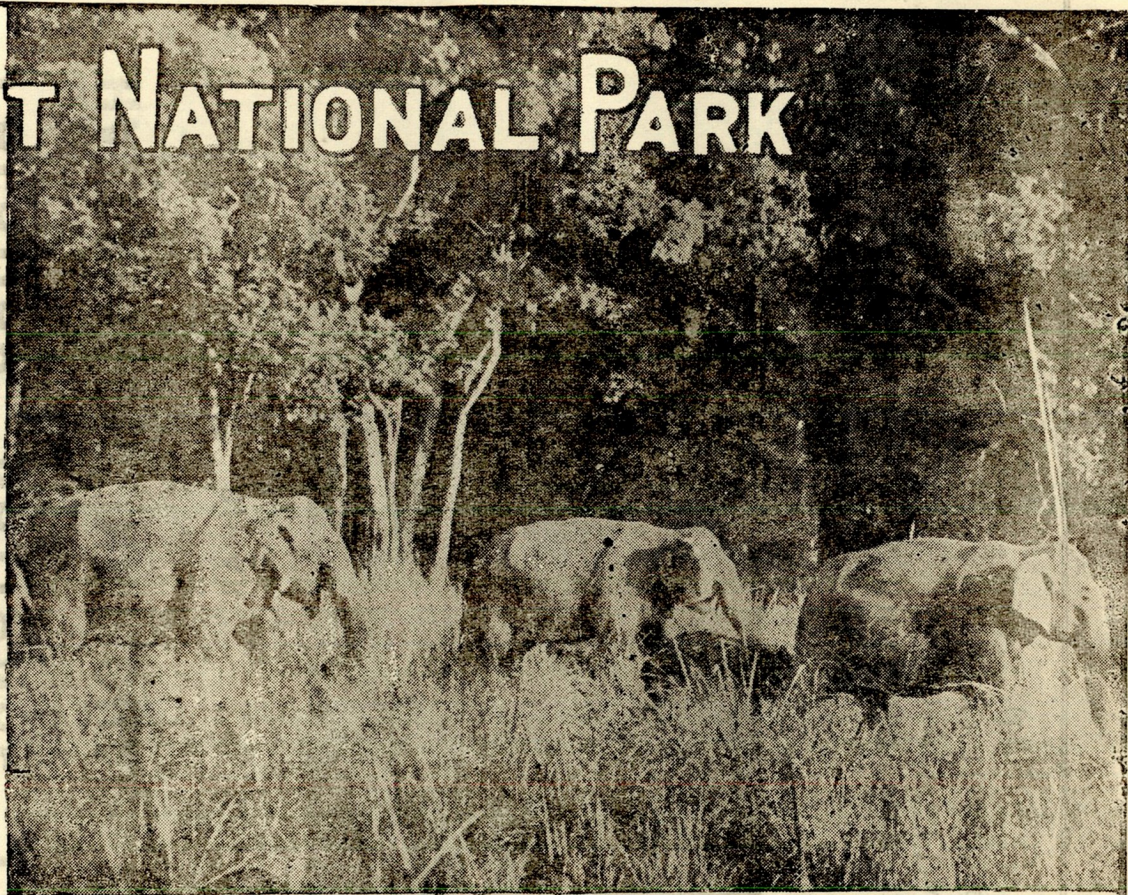
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Wild Life Preservation Society of India

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Editorial

Another Vanya Prani Saptah (Wildlife Week) has come and gone. This week is to be observed during the first week of October every year. It was intended to remind the people of this country of their rich wildlife heritage and draw their attention to the necessity of conserving it. The first week of October was chosen for this purpose because the birth anniversary of Mahatma Gandhi falls within that week—the 2nd October—and his love for wildlife and belief in *Ahimsa* would further the cause of wildlife. Further, the hunting season opens, in most States, from 1st October. Observance of Vanya Prani Saptah during this week would serve to remind would be hunters of their obligations to wildlife. No shooting permits or licences are issued for this week.

Though we had observed the 17th Vanya Prani Saptah this year, the observance is now a mere formality. Processions of animals, usually stuffed ones at that, are taken out in cities, and a few old well-worn films are exhibited in movie theatres. Brochures and posters are an annual feature. What have we achieved with the observance of this week during the past 17 years? Is there a better way to observe this week and is the first week of October the best period to observe it? In the observance of this week have we succeeded in drawing public attention to the need for conserving wildlife? Undoubtedly the administrators and those concerned with the matter have asked themselves these questions, but it is necessary that we assess what has been achieved and how best we can improve the observance of the Vanya Prani Saptah.

The people in cities where Zoos and Zoological Parks exist have no difficulty in visiting such institutions and the facilities offered during the week are an inducement to them, but there are few cities where these facilities exist. In some States the Forest Department offers free visits to sanctuaries, national parks and forests and even provides transport, guides and other inducements. But this cannot be done during the first week of October when forest roads have not been repaired and grass growth is so heavy as to reduce visibility to a few yards. The observance of Vanya Prani Saptah would be more meaningful if it were observed a little latter, say in November or December. This has been the practice in Dehra Dun for the last few years and it gives the school children of Dehra Dun an opportunity to visit the nearby Sanctuaries. True, Dehra Dun is particularly fortunate in having good schools and wildlife sanctuaries in close proximity to each other but this should also be possible in many other areas, viz. Madhya Pradesh, Assam, Maharashtra etc.

The Films Division of Government of India have made some documentaries on wildlife in the past but these are few and far between. In other countries, private institutions and even individuals have been in the forefront in this field even though the costs are high. States and even the Union Government could assist such institution and individuals with suitable financial grants, if necessary. These films could cover various aspects of wildlife conservation such as social behaviour, seasonal migrations, inter-relations between different species etc.

A number of cheap but good books on Indian wildlife have been published in recent years, some of them for children. We need many more of them and they have to be made more attractive to children. The book "Little Tiger, Big Tiger" by Lois Hamilton Fuller, published by Children's Book Trust, New Delhi, is an excellent example of what is needed for the smaller children. Incidentally the royalty from the publication of this book has been gifted to our Society to further the cause of wildlife. It is true that text books in schools now have some lessons on the wildlife of India but these are dull and matter of fact even though so much could be taken from the Panchtantra.

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In recent years, strong views have frequently been expressed on eucalyptus plantations vis-a-vis wildlife. The forest departments have been condemned for raising eucalyptus on the grounds that wildlife cannot exist in plantations of this species because of lack of food and cover, and because these plantations are usually created after destroying the original vegetation which more frequently than not, was a better wildlife habitat. Without going into the pros and cons of eucalyptus as an economic species to meet the demands of certain wood-based industries for fibrous raw material, and its place in the economic use of forest land, many of these plantations do develop a thick and sufficiently high ground cover with a good percentage of palatable grass, forbs and shrubs. In a short span of three to four years this ground cover provides both food and cover for wildlife, particularly jungle-fowl, partridge and pig, among others. The density of pellet-groups (groups of fecal matter) of deer in these plantations indicate their use, at least nocturnally. Admittedly the deer species do not browse on eucalyptus but they do graze the palatable grass and forbes in these plantations. Further, the forest departments cannot give priority to wildlife over all other land uses in all forest areas. But where wildlife does get priority, eucalyptus would have no place.

News item

A World Conference on National Parks will be a highlight of the National Park Centennial Celebration to be held in September 1972 in the U.S.A. The Centennial will commemorate the 100th Anniversary of the World's first National Park, Yellowstone (U.S.A.).

(Journal of Forestry)

Some Conclusions on Wildlife Problems

By

RICHARD WALLER

(1) "Wildlife" should be separated from the Forest Service and taken out of the hands of the individual States. It should become a 'Union' instead of a 'State' subject and a Wildlife Department at the centre should be set up to administer a *Wildlife Service*. This would hopefully give some uniformity to the many different wildlife regulations governing different sanctuaries; it would also enable promotion to be given from one wildlife post to another, thus avoiding the necessity of returning a wildlife-orientated forest officer to a purely forestry job in order to secure him a salary up-grade.

It may not be possible to create this service at once, but a start could be made with a 'Wildlife Wing' of the Forest Service under the Inspector General of Forests, aided by a high ranking forest officer with wildlife management training. Into this special 'wing' will be fed the men coming out of the recently started Wildlife Management Course at Dehra Dun. Mr. R.C. Soni, I.G. Forests, had this in mind when I had several talks with him in Delhi in August, 1970.

An eventual separation of 'Wildlife' from 'Forests' would make it easier to deal with the continuing forestry operations which cause much animal disturbance in many sanctuaries. These operations are continued because the "State Forestry Department cannot do without the income", as quoted many times throughout India. The States concerned would initially have to receive some compensation from Delhi, but with a Wildlife Service working closely with the Ministry of Tourism the increase of revenue from more tourists viewing better managed sanctuaries could soon balance this; further profits could be shared between the Centre and the States.

(2) Overgrazing by domestic livestock is a major problem all over India. As geometric progression of the human population explosion continues (the present rate of increase is 12 million people a year) the number of cattle are bound to expand. This is a deep-seated socio-religious problem to which no ready solution is apparent. The forests of India must be protected if her economy is to be maintained; her forest area is already far below the necessary level recognised by economists. Nearly all India's wildlife is found in the forests and the destruction of the latter, whether by overgrazing and consequent soil erosion or by clear felling for cultivation, will destroy the former.

Let the forests at least remain inviolate within the very small area which constitutes the wildlife sanctuaries and let every effort be made to lessen the grazing of domestic livestock

within the sanctuaries. It would be unrealistic to imagine that all cattle can be turned out of the sanctuaries, but the problem of overgrazing and its consequences must be fully realised, which is not the case everywhere. For instance it is not sufficiently appreciated that the elimination of the best grasses, not at first always taken seriously, is the beginning of the decline in the ecological composition which will surely lead to a loss of soil structure in a barren dusty waste from which top soil can disappear overnight and take many generations to replace.

Cattle diseases such as rinderpest, anthrax and foot-and-mouth, are yet another danger to the wild ungulates if domestic stock is allowed to roam throughout a sanctuary in large numbers. The principle of leaving a 'sanctum sanctorum' free of any domestic grazers and forestry operations is a sound idea. It is practised by some sanctuaries and should be by more.

Good quality breeds of sheep such as the merinos of Dachigam, which are an economic proposition for the State concerned, will probably have to be accepted as a part of a sanctuary. In the case of Kashmir it is quite possible that hangul (Kashmir Red-deer) and sheep can live together as deer and sheep do in other parts of the world. But Kashmir is an exception with its alpine pastures and temperate climate.

The fact remains that overgrazing by domestic livestock is causing destruction of nearly every environment throughout India. Without any doubt the cow is the greatest scourge of India and her foremost problem. Sadly the cow too often becomes an issue in State politics, where politicians who have their own and not the nation's future at heart, make political capital out of it. "The people will starve if they are not allowed their ancient grazing rights" is a tempting and vote-catching cry.

(3) *Poaching* is still a major problem in many sanctuaries despite recent tightening of controls. The poacher must be clearly separated from the hunter. The latter shoots for food, sport or prestige, the former shoots for money and, as many people in the world will do most things for money, he is a formidable opponent. The hunter however cannot be exonerated from blame for the present wildlife situation. Before the Second World War the wildlife in the forests of India was, rightly or wrongly, looked upon as the preserve of the rulers—the Princes and the British. After 1947 with freedom from foreign rule, wildlife was considered the property of the people and all who could went into the forests to kill everything that moved.

Protection, above all, is what is needed and there is little time to spare. Even now in 1970 it must be faced that there is hardly any wildlife, except birds and some small mammals, left in India outside the sanctuaries; by 1975 there will probably be none at all, other than birds, beyond the borders of the parks and sanctuaries. Whether there will be any left inside some of them depends entirely on *protection* of the animals as well as their habitat. The Wildlife Service, if it comes into being, should have a system of rewards to guards who

apprehend poachers. If at all possible, the salaries of forest or wildlife guards should be increased to lessen the temptation of bribes from poachers. When money is the aim, especially large sums, poachers can be dangerous and desperate if bribes are ineffective. Forest Guards should all be armed and with proper authorisation to use the arms. The fines and punishments for poaching should be brought into line with the offence and, if possible, unified throughout India.

(4) *National Parks* should be created, not just in name but in fact, if anything is to remain of India's wildlife. It makes a mockery of the accepted principle of a National Park if cultivation, grazing and forestry continue unchecked even after legal status has been given.

(5) *Crop protection guns*, bought under licence, should by law have sawn-off barrels.

(6) *Binoculars* should be made available to the chief wildlife officer of every park or sanctuary. Four or five pairs would be sufficient to enable guards on anti-poaching patrols or wildlife management duties to be issued with them for that particular operation. Good Japanese binoculars can be bought for about £10 sterling a pair. Some sanctuaries have only one, probably private. Others, like Corbett, have two issued by the Government. For a modest sum W.W.F. *could make a considerable impact by presenting two or three pairs to the sanctuaries where the need is greatest.

(7) *Tourist Facilities* fall far short of what is needed in many parks and sanctuaries. The Minister of Tourism in the Govt. of India is well aware of this and his plans for development in five major parks and sanctuaries has just started. India's tourist facilities are far behind many other countries, especially in wildlife localities, and foreign aid is much needed. Better tourist facilities at home and advertising abroad will attract more foreigners and foreign exchange, which in its turn will enable better salaries to be paid to wildlife personnel and protection for wildlife can be increased. The present vicious circle of no money for better tourist facilities, disillusioned tourists and less money earned by a sanctuary, must be broken and converted into satisfied foreign tourists spreading the word abroad, more tourists and money and hence better protected and organised sanctuaries and more animals to see.

(8) *Foreign aid* in the form of expertise and money is badly needed and was everywhere expressed strongly to me. This need is equally recognised in the Govt. of India at Delhi. I was in the position to initiate some of the help requested, having been specifically asked by F.A.O. of U.N.O. to look into certain projects in which India had expressed the need for international help and for which F.A.O. was willing and ready to help. Certain formalities are inevitable when aid is requested by a Govt. These were made as simple as possible and explained in conversation, but still nothing emerged as the bureaucratic wheels turned slowly. This is indeed sad when the desire to help and be helped is expressed on either side.

* World Wildlife Fund .

(9) *The Wildlife Management Course*, started at Dehra Dun in April 1970, is a case in point. I went to the Forest Research Institute at Dehra Dun at the request of the Inspector General of Forests and of F.A.O. I discussed the course and the help needed and relayed it to the necessary quarters. It is hoped that the necessary 'request' will come from Delhi in time for F.A.O. to help with the second course which starts in January 1971.

A Wildlife Management Course was strongly recommended by the I.U.C.N. Conference in Delhi in November 1969. The Indian Government is certainly to be congratulated on starting such a course comparatively quickly; it is hoped that it might expand into an international centre for training personnel from all over S.E. Asia in wildlife management techniques.

(10) *Education* of a technical nature, as mentioned above, is most necessary, but perhaps the greatest long term project for conserving the wildlife of India will be education in general 'natural history' in her schools from the youngest age groups upwards. In particular there needs to be a connection made between the theoretical and the practical. Too often biology and botany students have learnt all they know out of a book; they have never been in the field and even the idea of field studies is totally foreign to many of them. Talks illustrated with slides (the Bombay Natural History Society has small packets of excellent slides to loan) and films on animals and birds of their own country can stimulate an interest which, at the moment, is only rarely found amongst the young. The Wild Life Preservation Society of India, based at Dehra Dun, is making brave attempts on these lines and deserves all encouragement. The Education Dept. of the Govt. of Assam is to be congratulated on its small books on animals and birds for use in its schools; as is Dr. Robin Banerjee on his splendid lectures and films in schools.

(11) *Education of the general public*, most of whom cannot afford the time or money to visit a wildlife sanctuary, can be helped by small deer parks which are being established in several of the Indian States. These are a cross between an open zoo and a full-sized sanctuary, often of a hundred acres more or less, sited as near as possible to a large town or industrial district. One of these has been started privately by the managing director of a big coal mining company in the Damodar river valley near Asansol in West Bengal. Here the miners can bring their families to see, in a natural setting: sambar, cheetal, barking deer, blackbuck and peacock. This helps them to sense the beauty of these animals and not just think of them as things to be killed and eaten.

Delhi, Hyderabad, Mysore and Calcutta, to name a few, have good zoos—the first two excellent—but in such a vast country, the majority of people have no chance of seeing any wildlife, except in a zoo. Even the small Borivli Park, so convenient to Bombay, is beyond the reach or interest of many who live in the city. Small deer parks or enclosures, as well as acting as a breeding establishment, can for some people bridge the gap between those few

who still live in the forests near to the wild animals and the equally few more affluent people who possess cars and can visit sanctuaries.

(12) There is a great lack of even the most basic *ornithological knowledge* by the staff of most of India's sanctuaries and parks. In spite of having one of the world's leading ornithologists, Dr. Salim Ali, the average educated Indian has little or no interest in the bird life of his country even though it is in rich evidence everywhere; in a small garden in the middle of Delhi I recorded 45 different species. The foreign tourist however, who visits the wildlife sanctuaries, probably knows little of the birds of India but is fairly well acquainted with those of his or her home country and therefore has an eye for a bird and wishes to learn. These foreign tourists have often expressed to me, and to others I know, that they were most disappointed to find that in such and such a sanctuary they could only rarely find anyone to tell them the names of the common birds around the Tourist Rest House; and no one to help them with the many beautiful birds seen in the forest.

I tried to stimulate interest amongst the staff of the various sanctuaries by drawing up a list of the common and less common birds in their particular sanctuary, subdividing them where necessary into those of different habitats and cool and hot weather seasons. I explained that my lists of about 60 or 70 species should be considered as only the beginning of an eventual "Check-List of the Birds of...Sanctuary", and that visiting ornithologists could add to, and perhaps correct, my original list which should be displayed in a prominent place in the dining hall or lounge. Wherever I left such bird lists, in about half the sanctuaries visited, I sent afterwards as a presentation Salim Ali's two basic books of Indian Birds and Indian Hill Birds. In several cases I got an interest going amongst the staff or stimulated one that was already there.

(13) There is an urgent need for the teaching of *census techniques*. So far less than half of the twelve major sanctuaries or parks have carried out even a partial census. Of the few, such as Kaziranga, Kanha, Bharatpur and Palamau, some have done it on the strip method, others on the block method, according to the nature of the habitat. These censuses however are rarely carried out each year, so no definite conclusions can be drawn on population trends or population dynamics. Furthermore there has been no appraisal of the carrying capacity of certain sanctuaries or of particular habitats within those sanctuaries in relation to certain species. For instance elephants are probably getting too numerous for the area available to them in Bandipur and Mudumalai; cheetal certainly need cropping in several sanctuaries but more should be known of their numbers and movements before this is started. Wild dog are destructive vermin in some areas and must be shot.

No sanctuary or park in India has a properly set out '*Management Plan*' to which the staff can refer when certain decisions affecting the sanctuary as a whole have to be taken. Too often the planning of some tourist facility improvement will be found to clash at the last moment with the management of the wildlife of the sanctuary. If there had been an overall plan to refer to, this could have been avoided.

Techniques for taking censuses and drawing up management plans are being taught on the Wildlife Management Course at Dehra Dun, but until sufficient personnel have passed through that course it would be highly advisable if a foreign advisor well experienced in these techniques could work on them and, at the same time, instruct the staff in certain sanctuaries.

(14) *Threats to India's wildlife sanctuaries from necessary economic expansion* must be viewed in a balanced way. It helps no one and can rightly annoy the Govt. of India if foreign ecologists descend from their affluent armchairs and theorise on what should or should not be done, with little understanding of the needs of the country as a whole. The population explosion is an ugly fact and the Govt. of India is bravely trying to combat it. In the meantime the economic needs of an overcrowded country with an expanding economy must be recognised. Dams must be built for irrigation and hydro-electricity and much needed minerals must be mined if discovered in economic quantity. Large sheets of water can give certain scenic compensations as may well be the case in Corbett; and after the disturbance of building and clearing has finished, a natural calm descends again and animals return as has been seen in some of the reservoirs in the Nilgiri Hills and further south in Periyar.

Mining is of course a continuous and noisy process and would necessitate the alteration or moving of a sanctuary. The encouraging fact, which I found in the Nilgiris and in Rajasthan, where threats to wildlife existed from economic expansion, was the honest attempts by the various officials concerned to arrive at a compromise which would be in the best interests of the nation as a whole.

This was also the case with the present Sheep Research Station in Dachigam. Sheep of good quality breeds earn much for the Govt. of Jammu and Kashmir; the hangul earns nothing at present and can never, even in the future, earn much foreign exchange, unlike a rhino or a tiger. Even so, genuine efforts are being made to move the sheep to summer pastures outside the sanctuary and to cause the minimum disturbance at present within Dachigam.

(15) **The I.U.C.N. Conference in Delhi** of November 1969 made a great impact on Indian thinking on wildlife. The effect of it has done much to stimulate greater interest and enthusiasm amongst the people already aware of the wildlife situation in their country, and has caused others to think about something they had previously taken for granted. What is vitally necessary now is a steady follow-up and constant contact from the West with all those responsible for wildlife at the Centre and in the Sanctuaries themselves, ready to help in any way required. Indian conservationists, few though they may be in such a vast nation, are doing a great work and moving quickly about it in bringing in protective measures. They deserve every encouragement and recognition from their colleagues in other countries.

The Govt. of India appointed an "Expert Committee on National Parks and Sanctuaries" to take a very hard and critical look at both the wildlife and tourist situations in parks and sanctuaries. It started its work within about two months of the Delhi conference. Sankhala was the Secretary and there were seven members. Their report was ready in August and the recommendations were strong. The Indian Board for Wild Life now has Dr. Karan Singh as its Chairman which assures that its progress will be energetic. There is plenty of other evidence of the effect of the I.U.C.N. conference in stimulating awareness of the dangers facing their wildlife and their forests, as well as an equivalent amount of work being put into confronting them. I stress again that this needs full recognition from other countries and the maintaining of personal contact and encouragement.

Editorial Note. In continuation of the above article, Mr. Richard Waller gives some notes on a few important wildlife species in India.

Lion (*Panthera leo persica*)

The latest estimate for the lions in the Gir Forest is 150. It was impossible in the five months I had available in India to cover this as well as the other major sanctuaries. The precarious situation of the lions of Gir has been written up in several recent reports; all I would add is that, as with the tiger, protection is the key note to their survival. This is sadly not what it should be when one hears of the local villagers, many of them harijans, driving the lions off their kills to get the meat and hides for themselves !

Great Indian One-Horned Rhinoceros (*Rhinoceros unicornis*)

This animal can be considered endangered in so far as its numbers are fairly small, about 560 in all, and concentrated in a limited area. Its recent history is nonetheless a triumph of wildlife conservation and efficient protection, especially in Kaziranga in Assam. Early moves were made in the days of the British in India when, in 1906, the wife of the Chief Commissioner of Assam was most disappointed at failing to see rhino in this area after a day's search on an elephant. Reading the records of the earliest Kaziranga Reserve, her failure is not surprising as the numbers of rhino were estimated at about 40 and some put them as low as 20. The British Tea Planters had slaughtered nearly the lot. Luckily for the world the Chief Commissioner's wife was a forceful lady and brought such pressure to bear on her husband that he ordered the formation of the Kaziranga Reserve in 1907 and, with a fine disregard for the tea planters of his day, made the first step in saving this species of rhino from extinction.

There were bad times after World War II, followed by the triumph of conservation under the partnership of P.D. Stracey and E.P. Gee. Further success has continued in the rehabilitation of the rhino since E.P. Gee (Wildlife of India 1964) estimated 440 for India (Assam 375 and West Bengal 65). The figure for India is now about 560 of which

Kaziranga has 400 and probably more, Manas 40 with about 40 in other small reserves; while West Bengal has 80, mainly in Jaldapara and a few in Gorumara.

In 1966 Spillett (Spillett B.N.H.S. 1966) estimated 580 for India. The drop in the total figure is due to heavy poaching for rhino horn in the small poorly protected reserves in Assam as well as outside these reserves, for which he estimated 70 and 40 respectively; of these rhino virtually none remain. On the other hand numbers in the sanctuaries have risen since 1966:—Jaldapara from 50 to 80, Manas 15 to 40 while the Kaziranga figure remains at 400 only because a census has not been done since 1966. I believe the present number to be slightly higher. From these figures we can see clearly the effect of good administration and protection and vice versa. There is absolutely no alternative when it comes to saving a species but the right men determined to do a good job.

The rhino figure for Nepal presents a sorry picture. Gee (Wildlife of India 1964) estimated 185, Spillett (B.N.H.S. 1966) estimated 100, but now it is doubtful if more than about 70 remain in the Nepalese Terai. I was not able myself to visit this area from Katmandu due to the heavy monsoon, but the U.N. Wildlife Management Adviser, John Blower, was in the Chitawan Rhino Sanctuary in May. 50,000 to 80,000 villagers live, cultivate and graze many thousands of cattle within the sanctuary whose rhino habitat has now been virtually destroyed, with the exception of the 150 acres around 'Tiger Tops' which has been leased to the company for 15 years by the Govt. of Nepal and which they protect carefully so that their many foreign clients may see rhino. It is sad to note that the present position is the reverse of what is written in the popular edition of 'The Red Book' (1969). Instead: "The numbers of rhino are steadily diminishing and the last vestiges of habitat are being inexorably destroyed by the thousands of cattle and buffalo which overrun the Chitawan 'Reserve' " a quote from John Blower's letter to me of September 26th, 1970.

In spite of the state of affairs in Nepal which, as with tiger protection, could be altered overnight with orders from the right quarter, the position of the rhino in the Indian sanctuaries is very heartening.

Wild Buffalo (*Bubalus bubalis*)

This species now numbers about 1,000, all of which are in Assam with the exception of a small and rapidly dwindling number in the Nepalese Terai. The situation in Assam is good but they are concentrated in two sanctuaries only and rinderpest from domestic cattle could decimate their numbers at any time. In the well protected and administered Kaziranga Sanctuary, shortly to be a National Park, there are 550 (census of 1966) and possibly more, as the reproductive rate is good. The other sanctuary in Assam, Manas, claims 400 to 500. I would estimate at the lower figure.

Up to five years ago there were herds reported from the southern part of Bastar along the Godavari river. I have no direct experience of these but understand that poaching has

virtually eliminated them. The situation in Nepal is as bad for this species as it is for tiger and rhino. The Tappu Sanctuary in S.E. Nepal near Biratnagar exists now in name only. There is no protection and it is estimated that perhaps 30 may remain.

Swamp Deer or Barasingha (*Cervus duvauceli branderi*)

The sub-species 'branderi' is in a precarious situation and found now in small numbers only in the Kanha National Park in Madhya Pradesh. As a result of the I.U.C.N. Conference in Delhi at the end of 1969 and with the aid of a generous gift of money, ten barasingha have been placed in a specially built enclosure in Kanha. Intensive study and observation will now be carried out for one year from July 1970, covering the free animals in the park as well as those in the enclosure. The census of June 1970 gave their number as 66.

Kashmir Stag or Hangul (*Cervus elaphus hanglu*)

Form local estimates and conversations on them with wildlife and forestry personnel, I would put the over all figure at between 250 and 300, of which about 180 may remain in Dachigam.

Musk Deer (*Moschus moschiferus*)

Even an approximate estimate would be impossible to give for this species, living as it does in high and often inaccessible regions. Local conversations in Kashmir led me to believe that it is not as endangered as is sometimes thought.

Nilgiri Tahr (*Hemitragus hylocrius*)

This species exists in two main localities in South India, the Nilgiri Plateau in Tamil Nadu and near Munnar in the southern and highest part of the Anaimalai Hills, known as the High Range, in Kerala. There are also pockets of tahr on some of the high and inaccessible grasslands above the tropical rain forest stretching nearly to the southern tip of India at Cape Comorin.

The population on the Nilgiri Plateau is 400 or more, of which I had direct evidence of 195 within 4 days. It is hoped that a sanctuary or reserve will be created in this area of quite outstanding beauty. If such a reserve were to be controlled by the Forest Dept. and the Nilgiri Wildlife Association, with licences issued by the latter as at present, then there seems no reason why shooting of 'saddle-back' bucks should not continue. The Wildlife Association is run by people who know the area well and licences for shooting and fishing are most carefully controlled. It is a legitimate money-making way of cropping numbers.

The population on the Anaimalai plateau is at present in a healthy condition and well protected by the Tea Planters Association of the Kavandevan Company. It is however

threatened by the turbulent political situation in Kerala where political expediency by some is calling for the handing over of 'waste' land to the 'landless poor', irrespective of whether the land is fit for cultivation or not. I quote from a recent letter received from one of the tea planters, G.B. Shuttleworth : "a recent detailed survey disclosed 430 tahr in the Munnar area. They inhabit a high plateau region climatically unsuited to any form of cultivation with an average depth of soil extending to not more than six inches. Within six months of permitting encroachment in this area the settlers would leave, but by then there would be no more tahr. Only rigorous protection has succeeded in securing their presence here."

I found myself sitting next to the Governor of Kerala at a dinner party in Delhi in August; he showed knowledge of this area and keenness to protect the tahr but his constitutional powers are limited. If a Wildlife Dept. at the centre could be formed to take over all wildlife sanctuaries, such matters would be lifted out of the uncertainty of State politics.

Information on the pockets of tahr further south has been lost with my other documentation by an airline company. I can only state that a very rough estimate is a possible further 200 in areas of no protection. This might bring the overall figure of Nilgiri tahr to about 1,000.

Pigmy Hog (*Sus salvanius*)

I can substantiate nothing on this species, but some of the wildlife personnel of Manas Sanctuary have viewed it recently and they believe it is increasing. They estimate between 15 and 20. I have no information of its possible existence in other parts of the Terai and Duars.

On the habits of the Indian flying fox, *Pteropus G. Giganteus* Brunnich

By

H. KHAJURIA*

The Indian flying fox is of considerable economic importance. Besides being a cunning pest of garden fruit, its meat and fur can also be profitably utilized. A novel method to capture the bat for the latter purpose has recently been described (Khajuria, 1966). Good accounts of its habits were given by McCann (1934, 1942), Bhat (1942), Brosset (1962), Prakash (1963) and Prater (1965). However, a good deal of unrecorded data was collected by the writer in various seasons in Mandla, Jabalpur and Narsingpur districts Madhya, Pradesh. Details were observed, with the help of a powerful pair of binoculars.

Five colonies of this bat were observed at different places (Dindori, Manot, mandla, Gwarighat and Kareli). They were all very close to or in the center of human habitations. The number of individuals in a colony varied from about 30 to 350. The trees occupied were the shisham (*Dalbergia sissoo*), the mango (*Mangifera indica*), the tamarind (*Tamarindus indica*), the and peepal (*Ficus religiosa*). It is difficult to say what factors, if any influence the selection of a particular tree but thorny trees appear to be unsuitable for an obvious reason. The specimens as observed in November-December from 8.30 A.M. to 12 A.M. were very active, flying from one position to another, stretching and flapping their wings, scratching their bodies, pursuing one another, giving out different types of sounds, fighting and mating.

The reason behind their short diurnal flights from one position to another might simply be a change in position or to relieve the hind legs of the fatigue resulting from prolonged suspension or escape from the pursuit by another individual or a search for a mate. The main cause of frequent stretching and flapping of wings might possibly be the relaxation of muscles from the fatigue of being in one position for long. It did not appear to be only due to heat or cold because they were seen flapping their wings in both cold and hot hours of the day. Whether it had any relation to breeding activity was extremely doubtful because the habit was also observed in the non-breeding season (end of January). (McCann-1934) referred to a clapping-like noise made by the animals by beating the semi closed wings and suggested that the habit may be related to sexual activity. If this is different from mere flapping of wings, I have not been able to observe it. Many individuals were however, seen to move, with a vigorous forward and backward stroke, one of the wings against the ventral side, at the end of April. 'Fanning' mentioned by Prater (1965) might refer to this habit and is obviously meant for cooling the body. Scratching was done practically by all individuals but some indulged

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in it more frequently. It was done with the help of the teeth, the claws of the feet or those of the thumbs. When the foot was used for the purpose, the animal hung by one foot only. The cause of scratching was obviously heavy infection of ectoparasites, *Cyclopodia sykesii* (Westw.).

In the absence of any sexual dimorphism in colouration, it was not possible to establish the sex of all individuals. If an individual was approached by another too closely, the first reaction from the approached individual was to fight with claws of the thumbs accompanied by shrieks resembling "kin kin". If such a reaction from the approached individual was too violent, the pursuit might be given up, but if it was mild, the intruder would try to lick the external genitalia of the other. Such an action established the sex of both the specimens without doubt. However, if the pursuit did not culminate in such an action, it was quite possible that individuals might be of the same sex. If the female did not immediately move away, the male would try to mount the female which would give out its usual shrieks. After getting over the back of the female, the male would hold the former firmly with its wings, and thumbs and inflict a bite on the posterior parts of the neck and attempt copulation. During copulation the female gives out louder and longer shrieks and turns its head from side to side. Its body is slightly bent upon the back which probably helps copulation. Copulation was accompanied by the usual servicing movements. It was continued for a minute or so when the male would dismount and again try to lick the external genitalia of the female which might protest only mildly now. After this, the male would again mount but generally under lesser protest from the female. Such attempts to copulate generally varied from 2-3 in number. After this both the male and the female would rest close to each other. During copulation and sometimes in chase the male appeared to give out a sound resembling *ko-ko*.

It is interesting to note that copulation took place in normal quadrupedal manner and not from the ventral side as recorded earlier. Possibly the prolonged licking of female external genitalia by the male with its ventral surface close to that of the female might have resulted in erroneous observations. Sounds given out by a mating pair seemed to excite other males so that a number of copulations took place simultaneously with short intervals of comparative calmness. Simultaneous loud sounds from a number of individuals is a source of considerable disturbance to the local people at this time of the year. Several (old ?) individuals were seen completely at rest and were not disturbed by intruding males. They were probably not pregnant females because a female shot in the act of copulation carried a few weeks old foetus. It is interesting to note that females in an advanced stage of pregnancy can also mate. The testes of the male shot in the act of copulation were slightly bulging.

The females which flew off on the approach of the males were not seen being pursued. It could not be ascertained whether the male during copulation abandoned the grip by

its feet over the branch from which it was hanging. The number of mating individuals appeared to reach its peak in the morning. The time between about 11.30 A.M. to 3.30 P.M. did not appear to be very suitable for the purpose. Obviously the animals were in good spirits in the morning, after feeding during the night.

Two females with forearms 162 and 168 mm. collected at Gwarighat near Jabalpur on 5.1.64 carried fetuses with forearm 28 and 32 mm. respectively but a young female 152 mm. collected along with the above specimens, was not pregnant. Also a young male with forearm 155 mm. from the same locality had an imperfectly developed penis with characters of glans of the adult hardly visible to the naked eye. The whole organ unlike that of the adult was enclosed in the prepuce. It, thus, appears that it takes *at least* two years for the animals to become sexually mature. The colony under observation on 25.1.64 and 10.3.66 from 3 P.M. to 4 P.M. and 6.30 A.M. to 10.30 A.M. respectively, was more or less completely at rest, only a few individuals scratching their bodies, or stretching or flapping their wings. There were, however, a number of short fights with claws after the colony had been disturbed with two shots. Out of six specimens collected on 23.4.66, five were adult males and one subadult female. Again out of our specimens shot on 25.1.64, two were pregnant females, one young female, and one young male. This shows that sexual segregation may occur after mating. Females with newly born young ones have not been observed so far. Moghe (1952) found sperms in the uteri of females collected in August and early September in Central India. This is interesting because Marshal (1947) who studied breeding biology of the species in Ceylon with histological investigation, stated that mating starts in December in Ceylon. This may be due to the difference in climates of the two places. Mating was observed in Jabalpur district on 3rd September but the uteri of two females examined did not show any external signs of pregnancy.

Six individuals were seen to reverse the usual upside down hanging posture for a few seconds during which they hung by the claws of their thumbs. Five of these individuals were seen to pass out excreta in this position. One of the specimens was a female which passed out excreta after its external genitalia were licked by a male.

No individual was seen drinking although several were seen to pass over the Narbada river soon after they had left their roost in the evening in November-December. Possibly the low temperature of the season did not necessitate an immediate drink. It was intolerably hot at 12 A.M. in early November and it was difficult to imagine how a nocturnal animal could withstand the blazing sun to which even diurnal forms would not dare to expose themselves. According to local people the animal shifts to shady places in very hot or stormy weather. Most of the individuals of a colony observed at Gwarighat on 23.4.66 were concentrated under a thick branch apparently to avoid the direct sun. On 13.12.64 at 7.30 A.M. the individuals were spread all over the roost, but both wings were folded over the ventral surface and the face apparently to keep off the cold. Individuals were seen feeding on the fruit of the peepal tree at Dindori and Kareli in November and December

and on the fruit of a tree locally known as 'Morshally' in Jabalpur in January. Some individuals may continue on the diurnal roost even an hour after dusk, while others may return to it after leaving it for a while. On 16.11.63, the first bat left the diurnal roost at 5.45 P.M., and the last about an hour later. The species is so much used to human disturbance that a shot from a .12 bore gun may result in only a couple of individuals leaving the roost for a while. Continuous firing may result in considerable commotion. Once, on a second shot practically the whole colony left the roost but soon returned. At Dindori there were a number of active honey-bee hives on the trees occupied by the bat. There were also plenty of crows around but they were not seen in any way interfering with the affairs of the bat (of Bhat, 1942).

As will be evident from the foregoing account, there are important differences between the present observations and those recorded by McCann (1942) and Bhat (1942) regarding the mating habit of the Indian flying fox. There appears to be some mistake in observations rendered possible in case of Bhat by the presence of leaves. Although the climatic conditions obtaining in areas where previous observations were recorded, i.e., Bombay city (McCann), Ceylon (Bhat), are different to some extent, they apparently cannot account for the important differences in the mating posture, behaviour of the sexes and to some extent even for those in the mating seasons.

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The City of Flamingoes—A Mystery on Earth.

BY

K.S. SANKHALA

Thousands of nests as adobe houses over a million long pink legs dancing in a highly organised mass ballet with peculiar bedlam symphony of noises, presenting a unique background music, in a totally hostile and treacherous land of the Greater Runn of Kutch, is a sight on earth, never to be forgotten by those who could pay a visit to this land. I left Delhi on October 9, 1970 to visit this city of dreams. I failed in my first attempt. There was no transport available and I had to postpone my visit. I again attempted the trip with the help of the local authorities of Bhuj. I left Bhuj on the 19th October, 1970 for my expedition. After a long jeep ride of about 120 miles over rough road and covering stretches where there is no track, and a camel ride of over six miles, I reached the shore of the Greater Runn of Kutch on the 21st morning. Then started the long journey through the Marsh land of the Runn of Kutch, with no route and no direction, to an unknown destination, with no company except that of our own caravan of camels and their drivers, is never to be forgotten. My young camel driver, Sale Mohammad, was interesting. Smiling and extremely hard working, he was equally witty. When I asked him why did he chose that name, he smartly replied 'My folks like it'. He was the only lively company to break the monotony of the journey. The whole journey was as if I was passing through a fairy-tale-route in search of a city under the sea.

At the start of the journey through the marsh, the water was four feet deep and the poor camels with their flat foot pads which help them run swiftly with ease on sand, were walking slowly step by step. A camel walks with both the legs of one side lifted simultaneously but in this marsh with slippery bottom, they had to walk like elephants, keeping three legs always on the ground and lifting only one foot at a time. It gave no whirling movement to its legs as the elephant does in water, but clearly lifted its foot up, advanced and dropped it vertically. It was something like a march-time parade. The camel ride was decidedly more comfortable than an elephant ride in a similar situation. There were no mile-stones and no land marks to indicate the distance covered. We proceeded in the hope that we might reach our destination at least by sunset. There was no life to be seen except the occasional dragonfly resting on us or a few house-flies that our camels had brought with them.

The sun rose high and it was lunch time. The camels stopped and we opened our small lunch packets and munched our lunch, sitting on the camel's back. I asked Mohammad if we had come half way. He did not commit himself and said 'it was difficult to estimate distance in this deceptive Runn'. He confidently informed me that by the

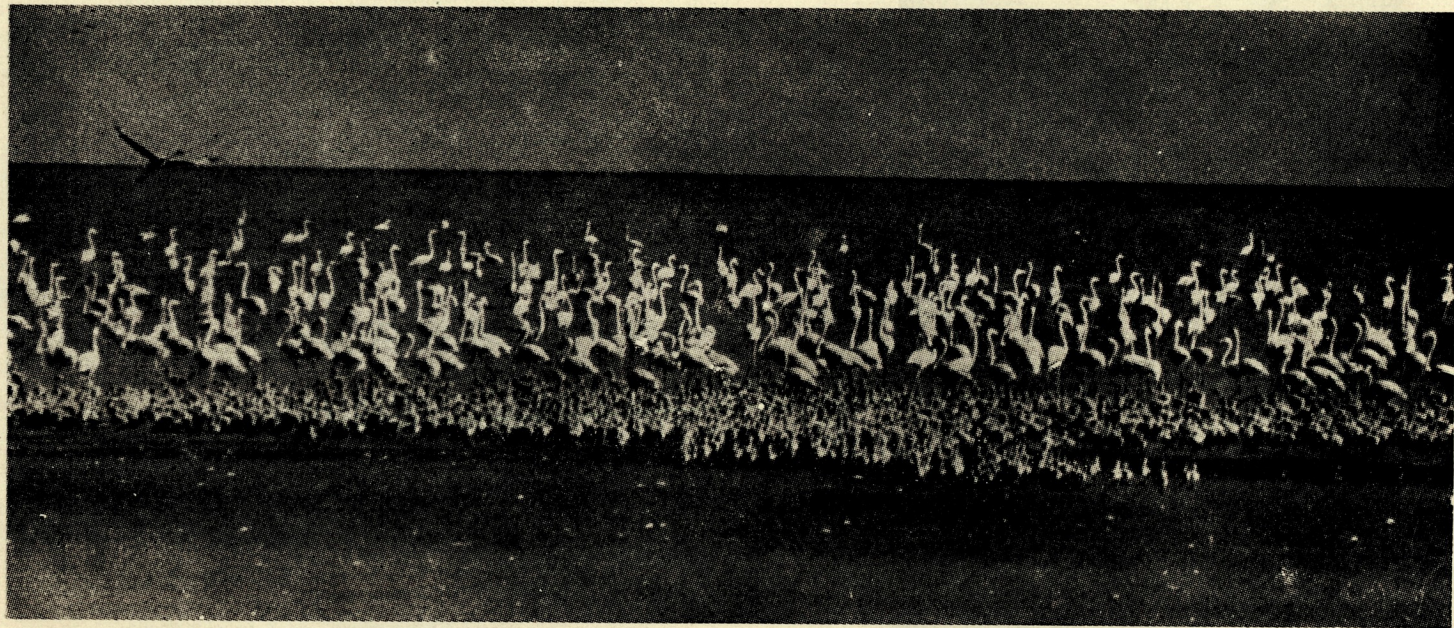
evening we were sure to reach our destination, 'the pakhi bet'. By 'Pakhi' he meant bird 'Pakshi'.

The short halt provided the much needed rest to the camels. We again resumed our march. The water started loosing depth and I became hopeful that our camels would have an easy time and the caravan could move faster. On the contrary, the camels started loosing ground, slipping, skidding and slithering through the mud. Our speed was further reduced with the camels occasionally slipping, and falling in the water, exposing our entire ration, the sweet water cans and even the photographic equipment to the dangerously corrosive brackish water of the Runn. The salinity of the water was so high that should anything fall into the loss would be total. The water in the Runn was more saline than the Arabian Sea. It was almost brine.

I saw the sun changing its direction from east to west. The whole day, the sun baked us thoroughly, burnt our faces and the exposed parts of our limbs. By 5.00 P.M. I saw a white line and my camel driver informed me that we were about to touch the shore. I saw a few white birds feeding in the water. The water became still more shallow and finally I saw the ground at a distance. Whether it was really high ground or another mirage, I did not know. Many times, during the journey, I thought I saw land and every time I asked my driver, Mohmmad, he simply smiled and said 'no'. In the last phase of the journey, there was hardly any depth of water. It was like a fine film over the land. The traversing of this part became still more difficult for the camels. Now the whole caravan started skidding. Another optical illusion, for I could not believe my eyes. The land mass moving under water as if it was an earth-quake. I thought this might be the special phenomena of the Runn. It was explained to me that this was an optical illusion and was created due to over gazing at the water for long hours. The sight was fixed on the waves which appeared stationary and the land appeared as a moving mass. Finally, struggling hard, the sure footed camels made the day and arrived on the island.

It is an oblong patch of land just emerging from the water, gently sloping on all sides. The highest point of the island was not more than nine inches above the water level of the Runn. Flamingoes were there in hundreds and thousands and still many hundred thousands sitting on nests and raising goose like gagging noises. This was the city of flamingoes. What a location: Horizons touching on all sides and the sky appeared much bigger than I had ever seen. Space and space and there was no dearth of space to spread your arms. The sky had clear zones. The light turbid blue near the horizon changing to light blue, finally to deep oceanic blue over head and once again fading into turbidity near the horizon on the opposite side. There was no obstruction to mar the view, no smoke, not even cigarette smoke as none of us smoked.

I approached the city. While I was approaching close, the birds rose and stood in silence, occasionally honking. Slowly, they left their nests and started walking out of the



Birds rise and stand in silence.

Photo—K.S. Sankhala.



“.....Whole open blue sky covered with birds.....”

Photo—K.S. Sankhala.



“.....a large number of houses with thousands and thousands of eggs.....”

Photo—K.S. Sankhala.

colony. Their long legs with pink stockings, white body and graceful long necks started parading out of the mud mounds. With few advances made by me,—probably I crossed the line of their tolerance,—and a long line of birds started taking off, bird by bird and soon flock after flock. In a couple of minutes, the whole open blue sky was covered with birds, streamlined with extended necks and fully stretched legs, in all types of formations, flapping their wide wings, displaying patches of pink colour on a snow white background and honking in despair. When the birds flew with this peculiar distress call, the chicks got together in hundreds and started hiding behind nest mounds. When I approached closer, even the chicks moved running here and there and whistling for others to join and leave the colony. Few thousand chicks moved out and walked towards the shore to join their parents. What I could see was a deserted city of adobe houses with thousands and thousands of eggs yet to be hatched lying on the roof tops. There was not a single soul in the city which was bubbling and gagging with life a few minutes before. A total exodus. It reminded me of the description of deserted Delhi after the historic 'operation exodus' ordered by Mohammed Tuglaq.

To study the city planning, I walked in through one of their main highways. I had hardly gone a few steps when I suddenly sensed the ground giving way and my feet going in. I turned left but it too was not a safe place. My guard Mohammad shouted and asked me to lie flat on the ground. I obeyed him almost like a reflex action. I had evidently inadvertently stepped into a patch of quick-sand. He walked up to me through the mounds and gave me a helping hand. He asked me to follow him through the mounds scrupulously avoiding the clear open ground. The ground there was a most treacherous patch of quick-sand where even camels sink without hope of recovery. The mounds were the nests built by the flamingoes. The flocks of birds arrive from far distant parts of India and even from abroad every year during late August and look for newly emerged land in the Greater Runn of Kutch, far away from the nearest mainland. The first flock settles down and starts puddling with mud. With the help of their beaks, they raise the mud and make patches sufficiently high to be safe from the subsequent rise in the water-level of the Runn. The mounds are raised about two feet high and a crater like depression is made on the top. Gravity helps to drain out water from the raised mounds and the desiccating sun dries them. The sodium clay so amply present in the mud gives it the required property and makes the nests steel hard. The birds build nests close to one another. Attracted by these pioneer birds, new flocks arrive and soon the city springs up with thousands and still many more thousands of nests. A date line is fixed for the construction of this city and there is no deviation however pressing, the need may be.

Watking through a patch of nests of flamingoes, I counted about 20,400 nests but I saw many thousands more in the colony. The nests were of varying heights. The well-formed ones had trunketed mounds 60 cms in height from the ground with 4 metres average basal circumference tapering to one meter diameter at the top. The tops had a depression for the

parent birds to safely lodge their eggs and comfortably sit for hatching the eggs. Generally, each nest had one egg but I found six nests where there were two eggs in each. There was also one with three eggs. These mounds appeared as miniature volcanic craters. The nests were in the groups of 8 to 12 almost touching each other, then an open patch or a corridor or a street of the city through which the birds come out for their daily activities. At times, they use their open spaces as run ways to take-off. The planning of the streets and nests is such that in and out movements of the thousands of long legged birds do not crush the thousands of eggs lying in the open or trample the flocks of helpless wooly ugly fledgelings. The design of the nest is a raised mound and with a deep cup at the top which helps protecting the eggs and chicks placed in them. Mounds obstruct the movement of the birds and they avoid them while landing or taking-off. The crater like depression further secures the egg. Still, the care the birds take, even during sudden flights and the traffic control is so marvellous that there are no accidents. I did not see any broken egg or trampled chicks. Most of the nests were complete mounds but the birds did not abandon the eggs displaced from the nests. They do not indulge in the herculian task of lifting the eggs all the way to the top of the nest crater. They either consider the operation as an impossible one or they are conscious of the hazards if the egg slips once again during the operation. They have only one egg and they cannot afford to take any chance. The parents hatch their only egg with great devotion. They make an improvised nest by scraping the ground and start hatching. Some nests had cozy beds of flamingo feathers but most of them were lying on bare hard ground. Each egg was more than double the size of a duck's egg or little bigger than a saras egg. The flamingo eggs were perhaps the biggest eggs I have ever seen in the Indian wilderness. When clean, the eggs were white but most of them were with mud plaster on them. The hatching goes on round the clock.

At the time when I visited the city, quite a few thousand nests were without eggs. Evidently the chicks had hatched and they were being cared for by their parents. A few chicks which could not follow their parents were hiding behind mounds. When chased they grouped together in a few thousands, whistling and playing hide and seek with me. Finally, they escaped in the open to follow their parents. The whole landscape—the land, the water and the air was full of nests, eggs, chicks and birds with gaggling, honking and whisteing noises. The chicks are like ugly ducklings with wooly body and black legs hardly indicative of the fact that they will develop into graceful long-necked and long-legged birds. These chicks wobble and gobble in the reed-like thicket of millions of legs of their parents. When I chased some chicks, they went farther and farther into the sea. How do the parents identify their chicks or the chicks their parents is a mystery unsolved. Ornithologists think that chicks are raised irrespective of ownership. They belong to the community as a whole and they are raised as a joint responsibility of the city commune. I saw a parent bird acting as a Kinder'garten school teacher taking the whole school for an outing to the sea-shore.

I entered another colony hardly 100 yards away from the first. This was a linear strip of smaller mounds. I counted 197 nests in a small patch of five square meters. There were about 15,000 nests in the colony. A few nests showed early stages of their construction. They were near boggy marshy patches of muddybrine. All the nests had only one egg in each. A few chicks were puddling with ease through these treacherous boggy spots where no animal or man could dare to step.

These hundred thousand big birds and still another hundred thousand growing chicks get their food regularly. The large flamingoes are carnivorous but there is hardly any visible sign of life in the brackish waters of the Runn. It is so saline that there is no trace of any animal or plant life. There are no insects worth the mention on the island. The birds are seen regularly rising from the colony and going to shallow waters for feeding and bringing food for their young. There must be microbes in such large numbers as to meet the daily ration supply for this big city.

The selection of the site by the flamingoes in this most hostile land where no living creature exists except the flamingoes, is the key to their intelligence. It is so far from the main land on all sides that it is difficult for any predator mammal, reptile or even bird to cross the barrier of the highly brackish water. The time factor too is in favour of the flamingoes. They start their activity in August and the chicks follow the parents by late November. There is thus hardly sufficient time for the predators to know about them and make an attempt on them. Why eagles, kites and various fishing birds do not visit the colony is still not known. I saw a few broken eggs and their contents spilt into the depression of the nests and a few dead half developed chicks. There being no crows, vultures or any other scavenging bird, they were just there. The only process of disposal that could be thought of, is the highly saline soil, desiccating winds, fully laden with salt particles and the scorching sun, dazzling, beyond description.

The sun went down below the horizon on the west but a beautiful glow continued in the west for another half an hour. The evening is really long. The night fell. It was a dark night—pitch darkness all over, except the twinkling stars which appeared brighter than I had ever seen in my life. I spread my sleeping bag and pushed myself in. Counting the stars and listening to the faint voices coming from the flamingo city, faint because of the unfavourable wind, I fell into sleep but I could not sleep, except for occasional snatches. I had a horrible feeling of loneliness in this total darkness, where if something went wrong, by way, for instance, a leakage in the water cans or even a minor ailment handicaping or delaying the return journey, nothing but death becomes certain. There is nothing that one can contact or communicate with. But the anxiety of revisiting the flamingoes city, which is unique on the earth, the next morning, kept my morale up.

Next morning, I thought of having a view from a higher angle and so commissioning my camel driver, I approachen the city again. This time a third colony. It too was full

with eggs. There were another 20,000 eggs lying on a verity of nests—full mounds, half mounds, broken mounds or even on plain ground. This appeared to be the more recent of the colonies. I strolled through the streets and lanes of the colony, carefully chosing the lanes and bye-lanes. Suddenly, I heard a noise. I looked round for a chick. There was none. Again a voice came from a nearby mound. It was a chick in an egg. I dismounted the camel and came close to the nest. There was a small crack on the egg. After a short interval, another call confirmed the latent life. Probably, the chick was calling its mother for help. I could not resist the call and at once offered my services as midwife. I was confident of my skill, as I had acted so, sevral times in my last assignment as a too director. With care, I removed its shell, piece by peice. There came the young chick with neck, head and little beak folded between wings and curiously coiled legs—a master packing done by God. The chick continued calling for its mother. I did not know the next step the flamingo mother takes to nurse its chick as it was the first occasion in my life of handling a flamingo egg. Probably, I am the first to be a flamingo midwife. The sun was hot and the chick needed the mother's shade. I immediately left the colony. I looked back. To my happiness, I saw the mother and the chick united. The mother took it into her fold and protected it against the bright and hot sun. And once again life became normal.

The sun had already started becoming hot and we were to cross the 14 mile water barrier, wading step by step before sunset. I decided to return to the base camp. The camels marched once again with the same caution and care, occasionally slipping and skidding. They made the day. I had a wonderful feeling and a sense of achievement of visiting the fabulous city of flamingoes. The return journey was covered faster and I was soon on the shore, little realising that a terrible wireless message was awaiting for me for the last 24 hours. My beloved daughter was no more. She did wait for me, as usual, for four days, but this time not to hear her bed-time story of my expedition to the city of flamingoes, but for her final farewell.

A 'Tilsmat' fairy tale ended with the departure of my princess for ever.

A Note on the Four-horned Antelope, *Tetraceros quadricornis* (Blainville), in Jabalpur Distt.

BY

H. KHAJURIA

This antelope is common in Jabalpur District. The fawns are commonly seen from February to May. Parturition appears to take place mostly in February. Two fawns, a male and a female, probably born during the month were in captivity in Jabalpur city for about a year. This is in conformity with observations of Prater (*The book of Indian animals*, 1965) who states that the young is dropped in January-February. However, according to Shull (*J. Bombay nat. Hist. Soc.*; 55(2):339-340, 1958) most of the fawns are born in October-November in Surat Dangs.

The male was obtained in April, 1970 when it was about two months old. The posterior pair of horns was visible after about three and half months but the anterior pair was still hidden in the hair and covered over by skin when the animal was examined on 16th February, 1971, although on the date of examination the horn was about 3 cm long. Although taken very young, the animal avoided a too close human approach. If force was used to touch it, it became very wild and tried to escape in a violent manner even when tied with a rope. When set free, it entered neighbours' houses and was several times attacked by dogs but managed to escape. However, once it was so severely bitten that it died of wounds later. It was fond of milk, bread and cabbage but rarely took grass. It gave out low barks sometime. As compared with the adult males described by Hardwicke (*Trans. Linn. Soc.* 14(3); 522, 1825) and Shull, it was quite docile.

The female is still alive in captivity and is much tamer. It feeds on grass, gram, jowar and other seeds. No one has so far heard it to give out any sound.

The local name available for the animal is *Bhirki* but the name also appears to be used sometime for the Indian gazelle and the barking deer.

The Indian Appeal gave a grant of Rs. 1,000/- to Mr. J.C. Daniel of the Bombay Natural History Society, to study the feasibility of a sanctuary for the endangered Estuarine Crocodile in the *Vitarkhanika Island* off Orissa Coast. This follows on the success of Mr. Daniel's similar venture for the Nilgiri Tehr on the grant by the W.W.F. Indian appeal last year.

The Cat Symposium

By

SHRI ARJAN SINGH

A symposium on the ecology, behaviour and conservation of the Worlds cats was held at Laguna Hills, California. The setting was the Lion Country Safari on the San Diego Freeway 40 Miles from Los Angeles. It was attended by conservationists and scientists from Asia, Africa and America. Unfortunately we did not gain much information regarding South America though all indications showed that the fur trade had considerably afflicted the jaguar and the ocelot. What, however, was extraordinarily heartening was the general attitude of the American public to the steep decline in the status of wild life populations of the world. Furriers Associations have declined the processing of skins of exotic species of cats for the making of coats, handbags rugs etc. in the interests of this major threat to endangered species, and are using ersatz material and domesticated varieties like mink and ermine. The construction of a jet airport in the Everglades of Florida, U.S.A. was discontinued in the interests of its wild life pollution. An Alaskan Oil pipeline was abandoned because of the inherent danger of pollution. Even during my short stay in the United States, the State of Arizona introduced a bill seeking to remove the Mountain lion from the predator list, to that of a game animal and thus abolish the bounty which had been introduced for its killing by the pressure of stock-owning farmers. Incidentally, mountain lion populations appear to be on the decline in all the states except Florida, but the abolition of the bounty is bound to have a salutary effect. Viewed against this background, our refusal to take action against the proliferation of processed cat skins in furrier shops, and indeed in the traffic of uncured skins, is a highly retrograd step.

Lion Country Safari is a transplant of Africa to America. Enclosures are divided by a system of moats and unobtrusively sited barriers. One hundred and fifty lions, and twenty-five cheetals share this artificially created natural habitat with the elephant, white rhino, hippopotamus and Cape buffalo and with most of Africa's spectacular antelopes. Ostriches, giraffes and zebras move leisurely out of the way to let cars pass on the road system. Its popularity is great and on the opening day, in 1967, there were twenty-six thousand visitors, with a daily average of eight thousand. The entrance charges are \$ 3.25 for an adult and \$ 1.50 for a juvenile. The initial outlay was \$ 12 million. There is a second venture in Florida and a third is proposed. A suggestion for an Asiatic section has been mooted and a vision irrepressively projects itself—a vision of Tiger Country Safari, when the last of our great mammals will be viewed in the United States. They already have viable populations taken from India, of blackbuck and Cheetal in Texas and the latter in Hawaii, The blackbuck are being returned to depopulated areas in India.

There is little knowledge in America of our wild life problems, whereas the African scene is coming to life in the United States. But there is a tremendous sympathy and a desire to help, combined with a puzzlement as to the methods to be employed. Unfortunately wild life does not go well with a socialistic pattern of society. There are no organisations like the National Parks & Conservation Association of America, which can channel aid to private enterprise which though discouraged, is the only hope that can lead to the promised land of wild life tourism. The Shikar outfitters have their own lobby in the United States and the symposium of selected conservationists and scientists had influenced the Secretary of the Shikar Safari Club who was at pains to point out the age old cliché that the commercial hunter was the prime conservationist, for who would wish to 'kill the goose which laid the golden egg.' However, we in this country know that that is not how Indian business functions. A case in point is Kishanpur block in South Kheri where two dead tigers were found during the shoot of Carlton Tiger Hunters. They however denied a knowledge of the dead tigers. Were they poachers or..... ?

I made the categorical rebuttal that none of the shikar outfitters I knew had clean hands. A pointer to illustrate that God is still with the big battalions, was the Game Conservation International Meeting in San Antonio, Texas, U.S.A. which had over 1200 delegates including a good representation from the Shikar Outfitters Association, but no conservationists were invited.

However the wind of change is blowing, albeit in a feeble current, and as a direct result of the IUCN Meeting there is a great awareness and sympathy in International Circles of the need to do something in a hurry, though naturally we must solve our problems ourselves.

The Cat Symposium was proposed on a yearly basis, but it was decided that it be held biennially, and the basis widened to include canids as well, and also hopefully to emerge not only as a study group, but as a spearhead for projected conservation measures.

We had a final meeting at Washington which was convened by the National Park & Conservation Association and was attended by major private conservation groups from the United States. Harold Coolidge, President of the IUCN acted as moderator, and it was with a predominately Indian bias that Paul Joslin was invited to speak on the Indian Lion. K.S. Shankhala and myself were the other two invited speakers together with R.L. Eaton who had acted as convener at the Cat Symposium and Leyhausen, Chairman of the Cat Specialist Group.

Speaking on the role of Parks and Sanctuaries in the conservation of wild life I emphasised that they were assuming increasing importance due to the heavy demands by human populations on the commercial utilisation of forests which had led to the degradation and destruction of wild life habitats and the replacement of vintage timber species by the planting of exotic and quick maturing varieties. I stressed that it was my

firm reading that wild life will ultimately only exist in parks and sanctuaries and we should as such fight the battle for survival on this restricted front, and not spread our resources too thinly or open our ranks to the accusation that human interests must come first. I said that India had tremendous problems in the unbridled increase of human and domestic animal populations and the increasing pressure on forests by these populations. Not even parks and Sanctuaries were sacrosanct against intensive forestry operations and cattle-grazing. Hitherto, the only justification that wild life had offered was the dollar earning value, of hunting, and unless we can replace this by a living potential, the ban on tiger shooting cannot last long. There are great pressures, both external and internal, at work. It is well known that the outgoing Chief Minister of the last coalition government in Uttar Pradesh had lifted the ban and it was only the wisdom of the Governor in cancelling the order, which saved the situation.

Finally I stressed that wild life organisations were a subsidiary part of the forest Dept. and unless private enterprise undertook the development of wild life Parks and Sanctuaries as tourist attractions, the future was a sombre one.

K.S. Sankhala unfortunately made it a point of refuting what I had said. Though there was a certain amount of timber exploitation and cattle grazing in the Corbett park' he said even this was being eliminated, whereas there were no forestry operations or cattle grazing in Bandipur, Mudumalai or Kanha. This statement and the report of the expert committee of the IBWL of which he was member Secretary if studied in conjunction with Schallers paper at the IUCN meeting stressed that the gaur of Bandipur and Mudumalai were drastically affected by rinderpest conveyed by domestic stock, and that the swamp deer of Kanha were suspected of having been infected by brucellosis, a cattle-borne disease, amounts to the dissemination of false and misleading information to international bodies who were responsible for funding which took him to the symposium. He also said that the Indian Govt. were discouraging private participation in wild life programmes.

Status of Wild Life in Bihar

BY

SHRI S.P. SHAHI, I.F.S

Chief Conservator of Forests, Bihar

Two books written in the twenties describe the mammalian fauna of Central India as it existed some 50 years back. Dunbar Brander wrote his well known book "Wild Animals in Central India" in 1923. Captain Forsyth in 1919 published his notes on the forests, its wild tribes and natural history of the territory now covered by the State of Madhya Pradesh, in his book "The Highlands of Central India". A picture of the past faunal wealth of the southern Indian States is obtained from Sanderson's "Thirteen years among the wild beasts of India" published in 1890. No such literature is available for Bihar, neither perhaps for the entire eastern region, from which one could get an authoritative glimpse into the faunal incidence of this State over the last 100 years.

Stray references however here and there confirm the belief that the State was as rich in its wild life as the neighbouring adjacent forests of Madhya Pradesh.

Haines, who published his classic work on the Botany of Bihar and Orissa (1921), mentions of Walter Hamilton (1820) who described the district of Singhbhum as in a very "savagely state being composed of rugged hills, uninhabited jungles surrounded by forests infested with wild beasts". Hamilton found the rivers and water swarming with fish, reptiles and alligators.

Speaking of the Rajmahal Hills (Santal Paraganas) Haines (1921) mentions of the terrible destruction of the forests which contained wild Elephants and Rhinoceros in a period described as "comparatively recent times". The destruction of forests of the Rajmahal hills by the twenties of the present century was so complete and the habitat ruined to such an extent that these majestic animals appear to have become extinct from here by the turn of the present century.

Arthur Musselwhite mentions of the shooting of a white tiger in the Lechuar jungle by the then Maharaja of Gidhaur. This forest is located in the Jumui sub-division of Monghyr district which I had occasions to visit in my capacity as D.F.O, Monghyr—some 20 years back. Sal trees had vanished and so its various associates and the forests when taken over by Government round 1950 consisted only of "euphorbia" indicative of the retrogression that had taken place over years of mismanagement. The valuable forest had been cut and habitat completely ruined—rendering the area unsuitable for the bigger mammalian fauna.

In 1940, an English man had shot in Sasaram forest, a white leopard. Black leopards are known but not white ones—probably a freak of nature.

Just as the hills and plains of Rajmahal abounded with rhinoceros, so did the tracts of Purnea with wild buffaloes. Herds of these handsome beasts used to roam in the Katihar sub-division of Purnea district until the end of the last century. A few solitary animals survived around 1920. Both the rhinoceros from Rajmahal and wild buffaloes from Purnea are now extinct. They are in fact, extinct from the whole State.

The Gaur (*Bos gaurus*) popularly known as bison, occurred in the Simdega sub-division in the Ranchi district and is recorded to have been shot by an Army Officer in 1883. It has now completely vanished from this district. This handsome beast is now confined to two localities only with a population of some 200 animals only over an area of a thousand sq. km.

Lydekker recalls of railway accident on the night of September 28, 1882 of Bengal-Nagpur UP Mail (now South-Eastern Railway). While travelling at a speed of 30 miles an hour it collided with an elephant between Goilkera and Manoharpur on a pitch dark night. Remains of the elephant found dead next morning were that of a big bull with a tusk 6' long. Such tuskers are now rare although elephant is the one such species which has continued to survive and adore some areas of Bihar forests even to-day. About hundred of them reside in two exclusive forest areas in Singhbhum and Palamau.

One of the handsomest creatures in the wild is the black buck. The leap of its does is beautiful beyond belief. This animal lived gregariously in herds of thousand in the forests of Champaran and Shahabad. Their habitat was open grassy lands with occasional trees in the upper canopy. Most of these uplands have been brought under the plough and the Buck has vanished from the Bihar forests although happily not entirely yet from its territory. A small population in some riverine area of Shahabad is fighting its last battle of survival. A pair of male bucks and three does rescued from this last refuge brought to Patna Botanical Garden appear to have adopted to its thirty-acre enclosure well. The three does have given birth to a fawn each recently.

Besides the vanished Black Buck (*Antelope cervicapra*) the other antelopes found in Bihar forests are the Nilgai (*Boselaphus tragocamelus*), chowsingha or four-horned Antelope (*Tetracerus quadricornis*) and the chinkara or the Indian gazelle (*Gazella bennetti*). As it is, India is poor in its variety of antelopes. Africa is essentially its home. Antelopes do not exist in the New World. The number of known species and sub-species of antelopes is great. There are about 170 in Africa (Odhams) compared to only four in the Bihar forests. The Eland, Greater kudu, bongo, bushbuck, impala hartebeests and others have made the African forests famous in the world. It is unfortunate that while we are poor in the variety of antelopes, the few that exist lead a precarious existence.

The Nilgai (Blue bull) is the largest antelope of the Indian forest. Lydekker mentions that Eland and Kudu (now confined to Africa) as testified by their fossil remains, were the companions of Nilgai on the plains of Northern India. Survival of Nilgai to some extent be attributed to its being regarded as a near relation to sacred cow. The Nilgai outside its forest habitat displays remarkable unconcern at the presence of man because of the immunity it has so far enjoyed from molestation. A year or two back, a couple of these animals very nearly collided at dusk time against an Indian Airlines Viscount on the runway at Patna aerodrome and the airport was closed to night landing. The forest dwelling ones are however, very wary and take to flight at the sight of man. The Nilgai has been described as an ungainly-looking animal, of no trophy value. Recently I saw a pair of male bulls with their excellent blue shiny coat and giraffe-like gait galloping fast enough in the Hazaribagh National Park—the sight was as magnificent any.

Chow-singha or the four-horned antelope is the only four-horned animal of this tribe in the World. The only other wild four-horned ruminant the world possessed was the Sivatherium of the Siwalik Hills which is now extinct (Lydekker). Unlike the black buck, the Chow-singha is not gregarious in habit and prefers to lead a solitar existence. It is therefore, not often that one encounters them in the forests. They are occasionally seen in the forests of Palamau and Hazaribagh and are now extinct from the rest of the forests of the State.

The Chinkara is the only gazelle still available in Bihar forests. Its distinguishing feature is that both sexes unlike black buck and Nilgai are furnished with horns. In the deer and antelopes usually the males have antlers and horns. These small and slender animals are invariably seen in small parties of two to four individuals over the Kaimur. Plateau of Shahabad even in day time especially during summer months under shady trees. Their speed in flight is great and before you can get near them, they race at great speed. Poaching over the Plateau has considerably reduced their number. The Plateau is a sanctuary created especially to save this animal. There is pressure from certain political quarters to release a part of this Sanctuary. The species will vanish if this pressure succeeds. The plateau is its last hold.

Of the deer tribe those that occur in Bihar are the cheetal (*Axis axis*), sambhar (*Cervus unicolor*), muntjac or the barking deer (*Muntiacus muntjak*) and Hog-deer (*Hyelaphus porcinus*). Grace and beauty of our deer and sambhar stags with antlers are matched only by their counterparts of the New World like moose, reindeer and caribou. Africa which is so rich in its antelopes knows deer only in some regions north of the Atlas Mountains. Wallace, a British naturalist explorer, pointed out that the species of animals were not spread at random through the world but that each major region had its own zoological character. There is a much greater similarity in the fauna of Eurasia and North America because these continents until quite recently were connected by a landbridge

across the present Bering Strait. Australia has been isolated by a sea barrier from the main land of the old world for many millions of years, hence the survival of its ancient mersupial fauna (*Carrington*). It is therefore, not surprising to find members of the deer tribe in Asia and North America as also the ox-tribe gaur (India) and Bison (America). These animals are absent from Africa and Australia.

The four members of the deer family particularly cheetal and sanbhar were at one time the most abundant animals covering the entire forest area of the State. They were the two the most prominent constituents of the forest biomass—the flora and fauna existing in perfect harmony—a hundred years back. Destruction of forests principally and persistent hunting and mass slaughter has now confined the deer tribe only to certain forests in the districts of Singhabhum, Hazaribagh and Palamau comprising 25% of our forest area. These two animals described as “integral component of Indian jungle scenery” no longer survive in major part of our forests.

The biggest concentration of cheetal is in the Betla National Park where about six hundred of them are now living and increasing their number steadily. Hazaribagh National Park is the main stronghold of Sambhar where nearly four hundred reside in safety. The Saranda Division in Singhabhum is the next best home of Sambhar after Hazaribagh.

The story of tiger (*Panthera tigris*) seems to complete the faunal tragedy that is threatening to overtake us in Bihar and possibly elsewhere, also in India.

The ancestral home of the tiger is believed to be the northern part of Soviet Russia. In its march across Asia via the Caucasus it seems to have travelled through South-East Asia to Malaya, Burma and then to India. Stracey feels it could not have travelled direct south to India because of the Sinkiang desert and the mighty Himalayas. According to Gee however, the tiger travelled to India directly south from Northern Asia through Assam. Whatever route the tiger took it is commonly believed to have come to this country some six thousand years back—a comparatively recent immigrant. It has taken over 150 million years for mammals to evolve from reptilian stock and it is unfortunate that in such a short time it should be now on the verge of extinction.

This priceless noble animal—Late M.D. Chaturvedi one of the most celebrated Forest Officers in the country and at one time India's Inspector-General of Forests wrote “there cannot be a price tag on tiger”—which occupied all major forest types of India is now on the run. It is fighting with its back to the wall. An idea of its past abundance is had from the number of animals shot by individuals, as quoted by Schaller. Maharaja, Udaipur shot one thousand tigers during his life time while Maharaja, Surguja whose forests adjoin our Palamau forest has 1150 tigers to his credit (or discredit). There are quite a few individuals who in the late nineteenth and early twentieth centuries have shot 200 to 300 tigers each.

According to Gee (1964) the tiger population in India now is about 4000 contrasted with a possible 40,000 fifty years ago. It can be assumed safely that the tiger population in Bihar too has decreased in the same proportion over the last fifty years.

I do not think there are more than fifty or so tigers left in Bihar, and these are confined in small population in the districts of Hazaribagh, Palamau and Champaran over nearly 10,000 sq. km. of forest area, i.e. in one third of the total forest area of the State. It has vanished from the other two third.

Alarmed at the precarious status of the tiger the International Union for Conservation of Nature which is akin to U.N.O. for Nature Conservation, recommended a moratorium on tiger killing for 5 years. This ban has recently been accepted by all States. Bihar was one of the first States to do so. I must, however, confess, for want of an effective law, it has not reduced poaching to the extent desired. The district of Champaran adjoining the Nepal forest would have been, for instance, the single largest home for this much persecuted magnificent animal but the prosperous farmers residing close to the forest boundary have been shooting them in the cane-brakes where the tiger from Nepal have of late been coming in larger number seeking refuge in Indian territory, as the adjoining sal valley in Nepal is being cleared for settlement purposes. As I write, a tiger shot a few days back in Latehar sub-division of Palamau district, has been paraded in broad day light in this sub-divisional town on 26th March, 1971. The usual defence is that the animal had killed his buffalo and that he was shot on the villager's own land.

There has been agitation from Shikar agents also, against this ban. In answer to such agitation, the I.U.C.N. in a statement from their head-quarters in Switzerland have highlighted the hitherto unappreciated fact that nowhere in India, there is perhaps a genetically viable tiger population capable of maintaining itself adequately. The statement says "To maintain a genetic pool of sufficient variety in a population of animals like the tiger, it is essential that a contiguous population totalling at least 300 head exists. All known tiger population in India are, as far as available information goes, of a such smaller number, and the areas separating these small remaining populations are of such a nature as to be absolutely prohibitive to regular genetic exchange between them. Hence the estimated number of two to four thousand tigers still existing in All India is misleading since no single population is large enough to maintain a healthy stock". Although the basis of 300 tigers is not clear from the statement the reason advanced is worthy of very serious consideration.

With about 50 tigers spread over 10,000 sq. km. of forests in three districts, one being the other side of the Ganges, the situation in Bihar is much more precarious than perhaps in U.P. and Madhya Pradesh. No exchange of population can occur between the species in Palamau with those in Champaran or Shahabad.

The I.U.C.N. statement further adds "furthermore, legalised hunting is, to a large extent, trophy-hunting, and trophy-hunting has a deteriorating effect on the quality of the population especially if this is very small. A striking example of how trophy-hunting can

affect a population of animals which is otherwise not threatened by extinction is provided by the African elephant. Tusks which would have been regarded as practically substandard seventy years ago rank as exceptionally fine in the present-day population." Cheetal and Sambhar carry antlers. These are mainly weapons for "intraspecific combat" between stags for the possession of the herd. These are also used in defence of territory, or for the leadership within a herd consisting of more than one male. In an "intraspecific combat" the stronger male wins over the weaker ones and propagate the quality of the race. Hunting these prized animals defeats the noble purpose for which such combats in the nature of wrestling bouts take place.

What is true of tiger is also true of sambhar, cheetal and gaur, the three wellknown wild animals of our forests.

Except for the sambhar in about 1000 sq. km. of forest in Singhbhum and Hazaribagh and the cheetal in 200 sq. km. in Palamau, gaur and elephant over 1000 sq. km. in Singhbhum and Palamau, no other wild animal in any other forest area in the State is in sufficient number as to constitute a genetically viable population. None of our Shooting Block or Blocks (if contiguous for exchange of population) can qualify for remaining open for hunting for another 5 years. There has to be in my view a minimum of 20 males and 60 females of each of the ungulate species before an area can be permitted to be hunted.

The total forest area in the State is 31,000 sq. km. A major portion of this is dry peninsular Sal (*Shorea robusta*). Sal (*Shorea robusta*) is the climatic climax species. Considerable area of these forests were subjected untill 20 years back to ruthless unscientific cutting by local inhabitants as these belonged to private owners.

As a result of protection and other development measures subsequent to the nationalisation of these forests, quite a substantial area have been rehabilitated and the habitat has once more become fit abode for wild animals. The two National Parks and Sanctuaries whose total area is 2,650 sq. km. forms only 8% of the total forest area. Many of these sanctuaries do not have adequate wild life.

The need now is to select compact Blocks of 10 to 15 sq. miles of these rehabilitated forests with minimum of human and cattle population and to re-stock these areas by introducing species which existed in them a century back. The species which breeds abundantly and adopts itself to quite a variety of habitat, is our cheetal (*Axis axis*). It was introduced, for example, in the And mans some 20 years back where it has bred very successfully in the dense evergreen forests of that island. It never existed there before.

Field level staff of the Forest Department have to be trained in the art of introducing wild animals, Cheetal to begin with, in such forest areas.

Needless to add that such areas will have to be more intensively managed. The domestic cattle will have to be inoculated. Small water retention dams will have to be

constructed to enable the introduced species to have adequate water during the summer months of February to June when usually water becomes scarce in these deciduous forests.

These efforts to be effective will have to be supported by a wild life wing within the Forest Department manned by men trained in the science of wild life management (as distinct from mere protection). They must, for instance, know the technique of animal census in forest condition, and be able to assess the adequacy or otherwise of food and water for both the herbivorous and carnivorous.

Above everything, there has to be an effective Wild Life Act covering the entire territory of the State. The issue is, will Government legislate timely or shall we miss the bus and lose what little is left of this national heritage?

The Indian Appeal continues to press for an Ordinance against the trade in tiger and leopard skins, in all states. The case has been strengthened by the fact that a person recently caught at Calcutta airport smuggling out 15 leopard and 9 tiger skins, with two baby Clouded Leopards, heavily drugged, in a tiny suitcase. This person has been accused and fined by the Calcutta courts. A similar 'grab' was made at Santa Cruz airport in Bombay on 21st March, when leopard skins were discovered with some Spanish Nationals. Much valuable work in uncovering skin-smuggling has been done by Mrs. Anna Wright, the Eastern Representative of INA and a member of Wild Life Preservation Society of India.

Symposium on Wildlife held at Betla, Palamau (Bihar) on the 26th to the 29th of May, 1971.

The following resolutions were adopted :

RESOLUTION NO. 1.

Wildlife Habitat

Whereas,

Wildlife in Bihar has reached a precariously low stage in-as-much as some of the species like black buck and chinkara are on the verge of extinction and a number of others, like tiger and panther are declining on account of serious deterioration of habitat caused due to reduction of forest area, location of development projects within and around the forest blocks, frequent and intensive forest fires, unrestricted grazing almost over the entire area and general destruction of forests,

this Symposium, recommends that convenient blocks of forests, keeping in view the accessibility and incidence of wild life, be selected and intensively managed to provide adequate preferred food, cover and water eliminating forest fires, grazing and other destructive influences.

RESOLUTION NO. 2.

Census

Whereas,

- (a) for the proper management of wildlife, it is necessary to maintain a record of the population with growth rate, age gradation and sex ratio of important species;
- (b) no estimate of wildlife population has been made in Bihar except in Hazaribagh and Palamau National Parks.

And whereas,

There is a need to develop a suitable technique of census for wildlife in the State. this Symposium, recommends that,

- (a) intensive census of wild life may be carried out in the sanctuaries and national parks of the State, and,
- (b) a suitable technique may be evolved and implemented for a reliable estimate of wildlife in the rest of the forests of the State.

RESOLUTION NO. 3.**Publicity**

Whereas,

- (a) there is a lack of appreciation of wildlife as an important national heritage, as an object of great tourist attraction sport and recreation, and this lack appreciation is due to inadequate publicity, so much so that even government servants and educated persons are not fully aware of the importance of wildlife;
- (b) there is need to inculcate love for wildlife in the younger generation so that they may study wildlife and grow up into enlightened citizens of the nation.

this Symposium, therefore, recommends that,

- (a) there should be adequate and constant publicity through press, pamphlets, cinemas, slide shows, radio talks, and other audio-visual aids;
- (b) the State Government should frequently, atleast once annually, issue a circular drawing the attention of all Government servants to the importance of wildlife conservation;
- (c) suitable articles on wildlife should find place in the text books prescribed for studies in schools and colleges; and,
- (d) the All India Radio may be requested to broadcast talks and features on wildlife on a regular basis.

This Symposium further recommends that a Publicity Cell be created under the proposed Wildlife Wing in the Bihar Forest Department.

RESOLUTION—NO. 4.**Recreation.**

Whereas,

- (a) very little has been done to utilise the vast resources of water in reservoirs of river valley projects for recreational purpose;
- (b) Kutku Dam is being constructed adjacent to the Palamau National Park;
- (c) it is felt that the resulting reservoir and its surrounding could be developed as a sanctuary and recreational park as an added attraction for the visitors to the Palamau National Park.

this Symposium, therefore, recommends that the State Government may ensure proper development of flora and fauna on sound scientific principles through the Forest Department and the reservoir be developed as a sanctuary and a recreational park.

And it further recommends that necessary provision in this regard may be made in the project from the very beginning.

RESOLUTION NO. 5.

Game Laws & Rules

Whereas,

- (a) it is felt that the present situation, with, wild life now at danger level and declining rapidly, warrants strong measures for its conservation ;
- (b) the existing Game laws and rules have become antiquated and need to be brought upto-date ;
- (c) the existing game laws and rules being faulty, lax and inadequate, do not provide deterrent punishment for poachers and persons infringing these rules and are proving totally ineffective in providing the desired protection to wildlife ;
- (d) there are a large number of game rules in operation in the different parts of the State and there is need to replace them by a uniform set of rules ;
- (e) there is no effective legislation to afford protection to wildlife occurring outside the forest areas ;
- (f) there is need for special legislation for national park and sanctuaries which are areas specially set part for the conservation, multiplication and study of wildlife.

this Symposium therefore, recommends that,

- (a) a comprehensive legislation for the protection and preservation of wild animals and wild birds applicable throughout the State of Bihar be enacted ;
- (b) a uniform set of shooting rules be framed under the proposed Act ;
- (c) the rules to be framed should provide for deterrent punishment for infringement of the laws and the rules ;
- (d) a suitable organisation with adequate authority be set up for the enforcement of these rules ;
- (e) the rules should afford full protection to the agency entrusted with the task of the enforcement of the rules ; and
- (f) a special legislation be enacted for national park and sanctuaries of the State.

RESOLUTION. 6.

Wildlife Research and Training

Whereas,

- (a) No reliable studies have been made and no data are available concerning wildlife habits, age gradation, sex ratio, optimum habitat conditions, over-population and under-stocking ;

- (b) these data are essential for scientific management of wildlife ;
 - (c) it is necessary to suitably integrate Wildlife Management with the present forestry practices ;
 - (d) it is necessary to find out the degree of competition and study other interactions between wildlife and domestic cattle ; and,
 - (e) there is lack of personnel trained in Wildlife Management.
- this Symposium, therefore, recommends that a suitable research unit should be created to initiate studies and conduct research into the various problems enumerated above.

The Symposium further recommends that the staff in the Forest Department should receive proper training in Wildlife Management for which purpose a Wildlife Training School should be opened at Betla in the State and suitable persons should be sent for specialised training outside, in the country and abroad.

RESOLUTION NO. 7.

Gun Licence and Crop Protection Guns

Whereas,

- (a) indiscriminate shooting takes place under the guise of crop protection and vermin destruction ;
- (b) the so called crop protection guns are grossly misused for illicit shooting regardless of season, sex and species particularly in the hot weather on water holes ;
- (c) there is no standing crops in the fields during the hot weather which are likely to be damaged by wild animals ;
- (d) mere scaring away of the wild animals would ensure crop protection and killing them is wholly uncalled for and unnecessary ; and,
- (e) some unscrupulous persons misuse the arms held by them.

this Symposium, therefore, recommends that,

- (a) issue of licences for crop protection guns should be controlled and the licences should be cancelled in cases of their misuse ;
- (b) the bore and the length of the barrel of the crop protection guns should be small or so that they cannot be misused for killing animals ;
- (c) crop protection gun licences should be issued on the condition that the guns be deposited in the Government Malkhana during the summer months between March and June in such areas which, as recommended by the Divisional Forest Officers have no standing crops in the field to be protected ; and,
- (d) licences for crop protection guns in forest areas should be issued in consultation with the Divisional Forest Officer, as suggested by Government of India.

RESOLUTION NO. 8.**National Parks and Sanctuaries**

Whereas,

- (a) there has been a sharp decline in wildlife population in the State ;
- (b) it is necessary to take intensive measure to restore the congenial environment for arresting the sharp decline in the incidence of wildlife ;
- (c) in view of the increasing heavy demand on forests and limitation of funds, it is not possible to take intensive conservation measures throughout the forest area of the State ;
- (d) certain specific areas of the State are eminently suited for development as national parks and sanctuary ; and
- (e) it is considered necessary to establish breeding farms for near extinct animals like black buck, chinkara and also for such animals like cheetal and sambar in the wildlife deficient areas.

this Symposium, therefore, recommends that ;

- (a) each territorial Division should have at-least one sanctuary covering approximately 10% of the total forest area of the Division ;
- (b) a National Park be established in Ganauli area of Champaran Forest Division because it adjoins the wildlife rich areas of Mari and Chitwan in Nepal, tourist facilities are available at Bhainsalotan and there is a good prospect of viewing wildlife including Rhino ;
- (c) a Bird Sanctuary be established in Udaipur Lake (Sariaman) in Champaran Forest Division.

this Symposium further recommends that;

one or more boeeding farms be established for propagating species like chinkara, black buck and cheetal and for re-stocking wildlife deficient areas.

RESOLUTION NO. 9.**Shikar**

Whereas,

- (a) there has been a general depletion in the population of wildlife due to the destruction of habitat, illicit shooting and general lack of scientific management;
- (b) the quality of the existing stock has also deteriorated in-as much-as heads which were of common occurrence a few years earlier—are now rarely met with;
- (c) a number of forest areas in the State which, at one time were considered to be good shooting blocks have become critically deficient in wildlife;

- (d) a number of wild animals such as chinkara and black buck have become nearly extinct and others like tiger, leopard, sambar and cheetal are also not commonly found in many parts of the State; and
- (e) it is felt that for scientific management which involves preservation, protection, augmentation and harvesting of wildlife, a number of detailed scientific operations like regular wildlife census, study of growth rate, improvement of habitat, and re-stocking of deficient areas have to be carried out.

this Symposium, therefore, welcomes the moratorium placed on the shooting of tiger and also recommends that a similar moratorium on the shooting of leopard, cheetal, sambar and chinkara be enforced for a period of 5 years.

The Symposium further recommends that necessary investigations in this regard be initiated without loss of time so that the position could be reviewed at the end of 3 years or even earlier in the light of facts revealed.

RESOLUTION No. 10.

Organisation of a Wildlife Wing

Whereas,

- (a) the need for conservation and scientific management of wildlife and its habitat for its cultural, educational, scientific and economic values has been universally accepted;
- (b) there has been an all round depletion of the wildlife population due to destruction habitat, illicit shooting and lack of proper management on sound scientific principles;
- (c) the State Government are likely to enact a comprehensive law for the protection of wild animals and birds within and outside the forest boundaries of the State;
- (d) it is felt that the management of wildlife in the existing and proposed National Parks and Sanctuaries has to be more intensive than at present;
- (e) wildlife in the country has been attracting large number of foreign tourists and thereby earning precious foreign exchange;
- (f) the problem of wildlife management involving protection, preservation, propagation and augmentation of various species is a complex one;
- (g) for proper management of wildlife it is necessary to carry out detailed scientific studies involving census, research and study of food and other habits of animals, improvement of habitat, management of breeding farms for near extinct animals and restocking of deficient areas;

- (h) there has been an increase in the incidence of illicit shooting in certain areas of forest which need to be ruthlessly countered.

and whereas,

- (a) the existing organisation of the Forest Department is considered to be grossly inadequate and ill-equipped to tackle the various problems enumerated above;
- (b) the present practice of forest management is not wildlife oriented;
- (c) the 10th General Assembly of I.U.C.N. held in New Delhi in November, 1969, adopted a resolution recommending "to the various Governments which have not yet taken this action, that they should give the highest priority to examining the possibility of organising separate departments or other governmental organisations at the highest possible level for the conservation of wildlife and its habitats throughout the country, for its cultural, educational, scientific and economic values";
- (d) government of India have been repeatedly pressing for the creation of a Wildlife Wing at the State level headed by a Conservator of Forests, as would be clear from the Minister of Tourist, Dr. Karan Singh's D.O. letter No. 26-50/69-FD dated the 20th January, 1970, addressed to the then Governor of Bihar.

and whereas,

it is felt that the flora and fauna constitute an integral ecosystem and it may not be advisable atleast in the initial stages to have a wildlife service independent of the Forest Department.

this Symposium therefore, recommends that the State Government be pleased to immediately order for the creation of a wildlife organisation as a wing of the Forest Department headed by a Conservator of Forests and initially manned by one Conservator of Forests, four Divisional Forest Officers and necessary complements of staff.

News

The Madras Snake Park was given an additional grant of Rs. 2,500/- by the World Wildlife Indian Appeal, in April. The Park has already attracted much publicity, and a regular audience, and now has a rotating number of 300-400 snakes, in neatly thached snake-pits. It has been greatly assisted by the Tamil Nadu Government's gift of an acre of land inside the Guindy Park.

Revised Synopsis of Birds of Dehra Dun and Adjacent Hills—Pt.-I (*Podicipediformes* to *Charadriiformes*)

BY

R.K. BHATNAGAR AND PRADEEP MISRA

SUMMARY

This article provides an upto-date, revised synoptic list of birds of Dehra Dun and the adjacent hills. It records a total of 132 species, referable to 7 orders (*Podicipediformes*, *Pelecaniiformes*, *Ciconiiformes*, *Anseriformes*, *Falconiformes*, *Galliformes*, *Charadriiformes*) and 16 families. The article also provides check references to facilitate further studies.

Introduction

The object of this article is to furnish a simple synoptic list of birds of Dehra Dun and the adjacent hills, so that the bird-watchers of the area have at their hand a ready reference list with notes on appearance, local distribution, habits etc. of local birds. The need for such a publication has become all the more necessary as with the present day nomenclatural changes, the list of birds by Osmaston (1935) has become difficult to consult and further this publication is extremely hard to come by. The last of course is the main idea and the hope that some future bird-watcher would write down the avifauna of Dehra Dun District, which from the zoo-geographical point of view, would be of worthwhile use to the taxonomists and students of avian migration. Such studies are needed from the point of view of avian-borne diseases, among others.

The synopsis conforms to the nomenclature of Ripley (1961). The citation of the first references have been abbreviated and under each species, references to Stuart Baker's Fauna of British India (FBI); Ripley's Synopsis (SYN) and to the Hand Book of the Birds of India and Pakistan by Salim Ali & Ripley (HB), have been given to facilitate further study.

It is hoped that the synopsis, though incomplete in certain respects, would meet the needs of future workers and who would make additions, where necessary.

Climatic, topographical and biotopic conditions

Dehra Dun District lies between 77° 35' and 78° 27' east longitude and 29° 57' and 31° 2' north latitude. It is one of the northern most districts of Uttar Pradesh. On the north-west it is bounded by Garhwal district of U.P. on the north-east by Himachal Pradesh and on the south by the district of Saharanpur, U.P. On its north and east are the Himalayas while on the south are the Siwalik Hills. Thus the valley, so known as the Doon Valley, is formed. This valley is also referred to as 'Dun' while the town proper as 'Dehra'. The average altitudes of 'Dun' and 'Dehra' are 1600' and 2500' respectively.

The district covers an area of 3089.5366 sq. kms. It is broadly divisible into three zones, the southern Siwalik Hill zone, the middle zone consisting of the valley proper and the northern zone consisting of the lower & outer Himalayan ranges, followed by the high Himalayan ranges beyond Chakrata & Mussoorie.

An admixture of tropical moist deciduous and subtropical dry forest types (Ripley's type No. 4) are found fairly wide-spread in the Siwaliks and in the Himalayan foothills. The later area is from Maldevta down to Raipur in east and south-east, to Masandhanwala and Kalsi in the north-west and south respectively. Some of the common forest species are sal (*Shorea robusta*), tun (*Toona toona*), semal (*Bombax ceiba*) and occasional forest plantations of sissoo (*Dalbergia sissoo*) and Eucalyptus. In the valley proper there are fairly vast areas of cultivated lands of cereals and sugar-cane. Among there are patches of waste land and scrub forests. Swamps of Savannah (grasses), 'Nagbooti' (*Calamus spp.*) and 'Sadabahar' (*Ipomoea carnea*) are now scarce except around forests and certain river banks. In the outer Himlayan ranges the vegetation is pine (*Pinus roxburghii*). This is followed by deciduous oaks (*Quercus spp.*) and silver fir (*Abies pindrow*), which go upto 11,000' elevation. Alpine pastures of dwarf shrubs of juniper with potentillas, geraniums etc. with short grasses continue after 11,000' elevation and rhododendrous upto the snow line.

The principle rivers flowing through the district are the Ganges in the east, Yamuna in the west and through the middle flow the Tons, Asan, Suswa and Song. Besides these there are many seasonal rivers (locally known as 'Rao') i.e. Bindal and Rispana etc. In the south-west, on the rivers Yamuna and Asan, a barrage has been constructed which has attracted to it some migratory birds. River banks are mostly covered with rocky bouldres, small sized stones and pebbles of lime stone. In general, the deposits are rocky, covered with a thin layer of soil but in the northern zone the soil is sandy with gravels.

The average annual rainfall is 116 cms., the maximum being between 20th June to 10th September and the hot damp climate is usually during this period. From late September to the end of October is the autumn when the weather is pleasant. Winter is the from November to February, and is severe in the northern zone but moderate in valley proper. Summer is from April to June, and is moderate all through.

SYNOPSIS

Podicipediformes to Charadriiformes

Class Aves

Sub class Neornithes

Order Podicipediformes

Family Podicipedidae

1. *Podiceps cristatus cristatus* (Linn.): Great Crested Grebe.

FBI, 6, 477/2290; SYN, 2/3 & HB, 1, 1/3.

Scarce, Yamuna at mouth of 'Giri' (0).

2. *Podiceps rufficollis capensis* (Salvadori): Little Grebe
FBI, 6, 481/2292; SYN, 2/5 & HB, 1, 1/5. (0).
Common in back waters & ponds (0).
Order Pelecaniiformes
Family Pelecaniidae
3. *Pelecanus onocrotalus* (Linn.): The White or Rosy Pelican
FBI, 6, 272/2177; SYN, 2/20 & HB, 1, 20/27
Rare, one record (in 1935) on Ganges near Raiwala (0).
4. *Phalacrocorax carbo* (Linn.): The Large Cormorant
FBI, 6, 297/2180; SYN, 9/26 and HB, 1, 26/37.
Winter visitant, Yamuna & Ganges (0).
5. *Phalacrocorax niger* (Vieillot): Little Cormorant
FBI, 6, 280/2183; SYN, 10/28 and HB, 1, 28/41.
Winter visitant—rivers Yamuna and Ganges (0). George (1957)
observed flying over New Forest (F.R.I.) in Oct., 56.
6. *Anhinga rufa melanogaster* (Pennant): Snake Bird
FBI, 6, 282, 2183; SYN, 10/29 & HB, 1, 29/43.
Fairly common near Yamuna barrage and occasionally on Ganges (0).
Order Ciconiiformes
Family Ardeidae
7. *Ardea cinerea rectirostris* (Gould): Grey Heron
FBI, 6, 339/2217; SYN, 36/12 & HB, 1, 36/45.
Occasionally on wet places in the 'Dun' (0).
8. *Ardea purpurea manilensis* (Meyen): Purple Heron.
FBI, 6, 337/2216; SYN, 13/37 & HB, 1, 37/57.
Rare, in eastern Dun on dense reedy beds (0).
9. *Butorides striatus javanicus* (Horsfield): Little Green Heron
FBI, 6, 357/2231; SYN, 13/38 & HB, 1, 38/59.
Nocturnal, uncommon in Dun, Lacchiwala and Kansrao, under
shaded trees (0 & W, 57).
10. *Ardeola grayii* (Sykes): Pond Heron or Paddy Bird
FBI, 6, 354/2229; SYN, 14/42 & HB, 1, 42/63.
Common, found along nearly all ponds (0); Resident—New Forest
(G, 57); Tons Valley—May to June (W, 49). Mainly rain and winter
visitant, numbers increase by June and decreases from November;
breeding, end June to August and young in August (W, 57).

11. *Bubulcus ibis coromandus* (Boddaert): Cattle Egret
FBI, 6, 349/2226; SYN, 15/44 & HB, 1, 44/66.
Fairly common along ponds and river banks of large rivers.
12. *Egretta alba modesta* (J.E Gray): Large Egret
FBI, 6, 346/2223; SYN, 14/46 & HB, 1, 46/69.
'..... beleived to be found in the Dun' (0).
13. *Egretta intermedia intermedia* (Wagler): Small Egret
FBI, 6, 347/2224; SYN, 15/47 & HB, 1, 47/71.
'..... beleived to be found in the Dun' (0).
14. *Egretta garzetta garzetta* (Linn.): Little Egret
FBI, 6, 348/2225; SYN, 16/49 & HB, 1, 49/72.
'..... beleived to be found in the Dun' (0).
15. *Nycticorax nycticorax nycticorax* (Linn.): Night Heron
FBI, 6, 354/2236; SYN, 17/52 & HB, 1, 52/78.
Fairly common in the Dun (0); Tons valley—June to August
(W, 57); Resident—New Forest (G, 57); mostly in summer, number increases
by 10th April and decreases by the end of August and breeds May to August,
uses twigs of sal and eucalyptus for nesting (W, 1959).
16. *Ixobrychus minutus minutus* (Linn.): Little Bittern
FBI, 6, 364/2236; SYN, 18/55 & HB, 1, 55/83.
Uncommon, on grassy swamps in eastern Dun (0).
Family Ciconiidae
17. *Ciconia episcopus episcopus* (Boddaert): Whitenecked Stork
FBI, 6, 324/2210; SYN, 20/62 & HB, 1, 98/62.
Uncommon in the Dun (0); Tons valley—January (W, 1949); George
(1957) observed 'soaring at/great/heights over New Forest';
uncommon winter visitant, earliest appearance Sept. and latest
February (White, 1957).
18. *Ciconis nigra* (Linn.): Black Stork
FBI, 6, 323/2209; SYN, 21/65 & HB, 1, 102/65.
Winter visitant, Tons valley, F.R.I. campus and Clement Town;
earliest appearance November and latest February (W, 1957).
19. *Xenorhynchus asiaticus asiaticus* (Latham): Blacknecked Stork
FBI, 6, 326/2210; SYN, 21/66 & HB, 1, 104/66.
Uncommon in Dun, breeding reported by Osmaston (1935) on
Ganges and Yamuna. White (1957) observed it in November and December.

Anatomically deaf and dumb, makes noise by snapping of beak.

Order Anseriformes

Family Anatidae

20. *Anser anser rubirostris* Swinhoe: Greylag Goose
FBI, 6, 398/2252; SYNt 27/81 & HB, 120/81.
Winter visitant along banks of Yamuna and Ganges (0). *Anser* sp.
-spring passage migrant (George, 1957); earliest heard November and
last in March (White, 1957).
21. *Anser indicus* (Latham) : Barheaded Goose
FBI, 6, 405/2258; SYN, 27/82 & HB, 1, 131/83.
Winter visitant along banks of Yamuna and Ganges (0).
22. *Dendrcygn a javanica* (Horsefield) : Lesser Whistling Teal
FBI, 6, 411/2260; SYN, 29/88 & HB, 1, 138/88;
Uncommon rain visitant in eastern Dun (0).
23. *Tadorna ferruginea* (Pallas) : Ruddy sheldrake Duck/Brahminy Duck.
FBI, 6, 416/2263; SYN, 29/90 & HB, 1, 141/90.
Winter visitant on banks and mud flats of Yamuna and Ganges (0).
24. *Anas acuta* (Linn.) : Pintail.
FBI, 6, 437/2274; SYN, 31/93 & HB, 1, 149/93.
Winter visitant along big rivers and tributaries (0).
25. *Anas creca creca* (Linn.) : Common Teal.
FBI, 6, 431/2271; SYN, 31/94 & HB, 1, 151/94.
Winter visitant along big rivers and tributaries (0); Tons valley
Oct. (White, 1948), spring and autumn visitant, earliest seen Sept, and latest
March (White, 1957); New Forest in spring and autumn (George, 1957).
26. *Anas poecilorhyncha* Forster : Spotbill Duck
FBI, 6, 421/2265; SYN, 32/97 & HB, 1, 157/97.
Fairly common winter visitant in Dun (0).
27. *Anas platyrhynchos* Linn. : Mallard
FBI, 6, 419/2264; SYN, 32/100 & HB, 1, 160/100.
Fairly common winter visitant along Yamuna & Ganges (0).
28. *Anas strepera strepera* Linn. : Gadwall
FBI, 6, 426/2269; SYN, 33/101 & HB, 1, 163/101.
Fairly common winter visitant in Dun but never in large numbers (0).

29. *Anas penelope* Linn. : Wigeon
FBI, 6, 429/2270; SYN, 33/103 & HB, 1, 167/103.
Occassional winter visitant in Dun, Yamuna and Ganges (0).
30. *Anas querquedula* Linn. : Garganey/Blue-wing Teal
FBI, 6, 439/2275; SYN, 34/104 & HB, 1, 169/104.
An early and late passage migrant. Only occassionally seen in the Dun, chiefly by the Yamuna river' (0).
31. *Anas clypeata* Linn. : Shoveller
FBI, 6, 442/2276; SYN, 34/105 & HB, 1, 172/105.
Scarce, occassionally in the eastern Dun (0).
32. *Netta rufina* (Pallas) : Red-crested Pochard
FBI, 6, 448/2278; SYN, 35/107 & HB, 1, 177/107.
Uncommon winter visitant along Yamuna (0).
33. *Aythya ferina* (Linn.) : Common Pochard
FBI, may be in Vol. 6. 448/2278; SYN, 35/108 & HB, 1, 180/109.
Occassionally along Yamuna and Ganges (0).
34. *Aythya nyroca* (Guldenstaedt) : White-eyed Pochard
FBI, 6, 453/2280; SYN, 35/109 & HB, 1, 182/109.
Occassionally along Yamuna (0).
35. *Nettapus coromandelianus coromandelianus* (Gmelin) : Cotton Teal or Quacky Duck
FBI, 6, may be in Vol. 6 453/2280; SYN, 37/114 & HB, 1, 190/114.
Rare in the district but occasionally in eastern Dun (0).
36. *Mergus merganser merganser* (Linn.) : Goosander or Common Merganser
FBI, 6, 469/2287; SYN, 39/120 & HB, 1, 203/120.
Fairly common winter visitant along Yamuna and Ganges (0).

Order—Falconiformes

Family—Accipitridae

37. *Elanus caeruleus vociferus* (Latham) : Black-winged Kite
FBI, 5, 125/1789; SYN, 41/124 & HB, 1, 212/124.
Occassionally in Dun in open country (0); Tons valley-April and May (W, 1949);
New Forest area-April (G, 1957) and Sahastradhara Hills & Khara-Dec., 1963.

38. *Pernis ptilorhynchus ruficollis* (Lesson) : Honey Buzzard
FBI, 5, 167/1819 SYN, 42/130 & HB, 1, 222/130.
Uncommon in Dun (0)-New Forest area in October, 55 (G, 1957).
39. *Milvus migrans govinda* (Sykes) : Pariah or Black Kite
FBI, 5, 122/1787; SYN, 43/133 & HB, 1, 227/133.
Common bird all around Dehra Dun, Mussoorie and Chakrata (0); Tons valley-throughout the year, April, 48-Feb., 48 (White, 49); Resident common breeding January to May (White, 1957) and New Forest-common resident (George, 1957).
40. *Haliastur indus indus* (Boddaert) : Brahminy Kite
FBI, 5, 118/1784; SYN, 44/135 & HB, 1, 230/135.
Scarce in Dun and Ganges above Hardwar (0); Tons valley-June to October (White, 1949); rare rain visitor in New Forest (George, 1957) and Sahastradhara Hills-December, 1963.
43. *Accipiter badius dussumieri* (Temminck) : Shikra
FBI, 5, 148/1803; SYN, 45/138 & HB, 1, 235/138.
Common in the Dun, avoids thick biotope (0); Tons valley in October and November, resident, fairly common in all wooded areas (W, 1957) and resident in New Forest area (George, 1957).
44. *Accipiter nisus melachistos* (Hume) : Indian Sparrow Hawk
FBI, 5, 161/ ; SYN, 47/148 & HB, 1, 245/148
Winter visitant in Dun and Siwaliks (0).
45. *Accipiter virgatus affinis* Hodgson : Besra Hawk
FBI, 5, 161/1814; SYN, 47/150 & HB, 1, 247/150.
True forest Hawk, chiefly between 4000' to 7,000' (0); Tons valley Sept. and November (White, 1949) and New Forest, Feb., 51 and Oct., 53 (George, 1957).
46. *Buteo rufinus rufinus* (Cretschmar) : Long-legged Buzzard
FBI, 5, 137/153; SYN, 48/153 & HB, 1, 252/153.
Occasional winter visitant in Dun, Summer visitant at 12,000' to 15,000' where they breed (0); New forest area-rare winter visitant (George, 1957); earliest appearance in October and latest in March (W, 1949).
47. *Butastur teesa* (Franklin) : White-eyed Buzzard Eagle
FBI, 5, 104/1774; SYN, 49/157 & HB, 1, 257/157.
Fairly common all round in open country, resident,
48. *Spizaetus nipalensis nipalensis* (Hodgson) : Hodgson's Hawk Eagle
FBI, 5, 89/1760; SYN, 50/158 & HB, 1, 259/158.
Fairly common in the hills around Chakrata and Mussoorie where it predate on pheasants etc. (0).

49. *Spizaetus cirrhatus limnaetus* (Horsfield) : Changeable Hawk Eagle
FBI, 5, 87/1756; SYN, 50/160 & HB, 1, 160/251
Common in Dun mainly in the Sal forests where it predares on jungle fowl, kalij and occasionally pea-fowl (0).
50. *Spizaetus cirrhatus cirrhatus* (Gmelin) : Indian Crested Hawk Eagle
FBI, 5, 85/1756; SYN, 50/161 & HB, 1, 161/262
Uncommon in Dun, Siwalik Sal forests (0). New Forest,—resident but rare. (George, 1957).
51. *Nisaetus fasciatus fasciatus* (Vieillot) : Bonelli's Hawk Eagle
FBI, 5, 77/1752; SYN, 51/163 & HB, 1, 266/163
Hills near Chakrata and Sahiya; rare in Dun (0). Tons valley December to March (White 1949).
52. *Aquila chrysaetus hodgsoni* (Ticehurst) : Himalayan Golden Eagle
FBI, 5; SYN, 52/166 & HB, 1, 273/166
Tons valley—March and December (White, 1949).
53. *Aquila heliaca haliaca* (Savigny) : Imperial Eagle
FBI, 5, 69/1747; SYN, 52/167 & HB, 1, 274/167
Rare winter visitant in Dun (0); Tons valley—not uncommon in winters, earliest appearance December-7 and last in March (W, 1949).
54. *Aquila rapax vindhiana* (Franklin) : Tawny Eagle
FBI, 5, 72/1749; SYN, 53/168 & HB, 1, 276/168
Common in Dun (0); White (1957) doubtfully records it in winters-Tons valley-April, September and October (White, 1949).
55. *Aquila nipalensis nipalensis* (Hodgson) : Eastern Steppe Eagle
FBI, 5, 70/1748; SYN, 53/169 & HB, 1, 278/169
Winter visitant in Dun (0). White (1957) doubts species *nipalensis* or *rapax*.
56. *Ictinaetus malayensis perniger* (Hodgson) : Black Eagle
FBI, 5, 83/1755; SYN, 54/172 & HB, 1, 283/172.
Mussoorie and Chakrata—uncommon (0). Tons valley (G, 1957).
57. *Haliaetus leucorhynchus* (Pallas) : Pallas Fishing Eagle
FBI, 5, 112/1779; SYN, 54/174 & HB, 1, 289/174.
Breeding bird Yamuna and Ganges, Kansrao; in north-west upto Tiuni (0).
58. *Ichthyophaga nana plumbea* (Jerdon) : Himalayan Greyheaded Fishing Eagle
FBI, 5, 117/1783; SYN, 55/177 & HB, 1, 294/177
Along Yamuna, Tons and their tributaries inside the hills (0).
59. *Torgus calvus* (Scopoli) : Black or Pondicherry Vulture
FBI, 5, 9/1706; SYN, 56/178 & HB, 1, 296/178
Fairly common all around usually in company of some White-backed Vultures around dead animals; resident-in New Forest and Tons valley.

60. *Aegyptius monachus* (Linn.) : Cinereous Vulture
FBI, 5, 7/1705; SYN, 56/179 & HB, 1, 298/179
Rare winter visitor in Dun and also on higher hills (0).
61. *Gyps fulvus fulvescens* (Hume) : Indian Griffon Vulture
FBI, 5, 11/1707; SYN, 56/80 & HB, 1, 301/180.
Scarce in Dun, one record from Siwaliks (0); Tons valley-resident but rare, May and October (W, 1949) and New Forest area—resident but scarce (G, 1957).
62. *Gyps himalayensis* (Hume.) : Himalayan Griffon
FBI, 5, 13/1709; SYN, 57/181 & HB, 1, 302/181
'Fairly common in the hills beyond Chakrata, breeding on cliffs (0). Tons valley—common in winters and earliest appearance October (W, 1957).
63. *Gyps benghalensis* (Gmelin) : Indian whitebacked Vulture
FBI, 5, 19/1713; SYN, 58/185 & HB, 1, 307/185
Common in the Dun, Tons valley nearly throughout the year and resident in New Forest area. On dead carcass—nearly 90%.
64. *Neophron perconopterus ginginianus* (Latham) : Egyptian or Scavenger Vulture
FBI, 5, 23/1715; SYN, 58/187 & HB, 1, 312/187
Common nearly throughout, on refuge, breeding early summer, fledgings in April.
65. *Gypaetus barbatus aureus* (Hablizl) : Bearded Vulture or Lammergeier
FBI, 5, 26/1716; SYN, 59/188 & HB, 1, 314/188
Common in hills upto 4,000 to 12,000 (0); Tons valley—uncommon, earliest October, latest January (W, 49) and New Forest—rare winter visitant (G, 57).
66. *Circus cyaneus cyaneus* (Linn) : Hen Harrier
FBI, 5, 131/1792; SYN, 69/189 & HB, 1, 317/189
Common winter visitant in Dun (0).
67. *Circus macrourus* (Gmelin) : Pale Harrier
FBI, 5, 128/1790; SYN, 59/190 & HB, 1, 319/190
Common winter visitant in Dun (0); Tons valley—April and May (W, 49).
68. *Circus pygargus* (Linn.) : Montague's Harrier
FBI, 5, 130/1791; SYN, 60/191 & HB, 1, 321/191
Common winter visitant in Dun (0).
69. *Circus aeruginosus aeruginosus* (Linn.) : Marsh Harrier
FBI, 5, 134/1794; SYN, 60/193 & HB, 1, 324/193
Uncommon, in winters occasionally along ponds and marshy grasslands; Tons valley—earliest July and latest in December (W, 49).

70. *Circaetus gallicus gallicus* (Gmelin) : Short-toed Eagle
 FBI, 5, 93/1764; SYN, 61/195 & HB, 1, 327/195
 Uncommonly in Dun, frequenting open country (0); New Forest area—resident but seen on rare occasions (G, 57).
71. *Spilornis cheela cheela* (Latham) : Indian Crested Serpent Eagle
 FBI, 5, 96/1765; SYN, 61/196 & HB, 1, 329/196
 Dun—fairly common on foothills (0); Tons valley—common resident in well wooded areas specially in tea gardens, breeding February (W, 49); New Forest—resident (G, 57).
72. *Pandion haliaetus haliaetus* (Linn.) : Osprey
 FBI, 5, 3/1704; SYN, 63/203 & HB, 1, 336/203
 Occasional winter visitant on Ganges and Yamuna (0).

Family—Falconidae

73. *Falco biarmicus jugger* (Gray) : Lagger Falcon
 FBI, 5, 37/1721; SYN, 64/208 & HB, 1, 349/208
 Dun—uncommon straggler in open cultivated country with trees (0) and New Forest—one record October, 55 (G, 57).
74. *Falco peregrinus japonicus* (Gmelin) Peregrine Falcon
 FBI, 5, 32/1718; SYN, 64/209 & HB, 1, 347/209
 Occasional winter visitant on rivers Ganges and Yamuna (0).
75. *Falco subbuteo subbuteo* (Linn.) : Hobby
 FBI, 5, 42/1724; SYN, 65/212 & HB, 1, 212/349
 Hills beyond Chakrata; occasionally breed at 8,000' (0).
76. *Falco peregrinus pergrinatus* (Sundevall) : Shahin Falcon
 FBI, 5 34/1719; SYN, 65/211 & HB, 1, 350/211
 Dun and Siwaliks—occasionally (0); Tons valley—winters, earliest in November (W, 57) and New Forest area—resident but rare (G, 57).
77. *Falco severus rufipedcides* (Hodgson) : Oriental or Indian Hobby;
 FBI, 5, 47/1729; SYN, 66/214 & HB, 1, 355/214
 Uncommonly in hills (0), resident but rare in New Forest area (G, 57).
78. *Falco chiquera chiquera* (Daudin) : Redheaded Merlin or Turumti
 FBI, 5, 47/1730; SYN, 67/219 & HB, 1, 219/359
 Uncommon in Dun (0); Tons valley—uncommon winter visitant earliest appearance December (W, 49 & 57).
79. *Falco tinunculus tinunculus* (Linn.) : Kestrel
 FBI, 5, 61/1740; SYN, 68/220 & HB, 1, 365/220
 Fairly common winter visitant in Dun and summer visitant in the hills, in open country (0); Sahastradhara hills— March, 64, February, 66 and 67.

Order—Galliformes

Family—Phasianidae

80. *Tetrao himalayensis himalayensis* (Gray) : Himalayan Snow-Cock
FBI, 5, 426/1989; SYN, 71/232 & HB, 2, 13/232

High hills (Chakrata and Tiuni) (0). Present record doubtful.

81. *Alectoris gracea chukar* (Gray) : Chukar Partridge
FBI, 5, 402/1972; SYN, 73/236 & HB, 2, 18/236

Chakrata, Mussoorie and higher Sahastradhara hills.

82. *Lerwa lerwa* (Hodgson) : Snow Partridge
FBI, 5, 433/1993; SYN, 69/227 & HB, 2, 6/227

Higher hills (Chakrata) close to snow (0).

83. *Francolinus francolinus asiae* (Bonaparte) : Black Partridge
FBI, 5, 408/1976; SYN, 73/238 & HB, 2, 22/238

Uncommonly resident nearly throughout the area in grassy plains, ascends Himalayas upto 7,000'. Number diminishing largely due to the clearing of the scrub iotope.

84. *Francolinus ponderianus interpositus* (Hartert) : Grey Partridge
FBI, 5, 421/1964; SYN, 74/245 & HB, 2, 30/245

Fairly common through the grassy plains upto about 3,000'. Breeding end of February, coveys in September, in full strength (W, 57).

85. *Coturnix coturnix coturnix* (Linn.) : Common Quail
FBI, 5, 372/1950; SYN, 76/250; HB, 2, 37/250

Common spring and autumn migrants in Dun, a few remain to breed, others return by summer (0).

86. *Coturnix coromandelica* (Gmelin) : Black-breasted Rain Quail
FBI, 5, 375/1952; SYN, 76/252 & HB, 2, 41/252

Rain visitant in Dun and occasionally breeds.

87. *Coturnix chinensis chinensis* (Linn.) : Blue-breasted Quail
FBI, 5, 364/1948; SYN, 77/253 & HB, 2, 42/253

Rare bird in Dun (0). Not reported in our area since 1935.

88. *Perdica asiatica punjaubi* (Whistler) : Jungle Bush Quail
FBI, 5, 377/1953; SYN, 78/256 & HB, 2, 47/256

Common in grasslands of Dun (0); Tons valley (W, 49), resident and breeds in September (W, 57). Record of this sub-species from our area doubtful due to identifications by Osmaston and White (49).

89. *Arborophila torqueola torqueola* (Vallencienes) : Common Hill Partridge

FBI, 5, 386/1959; SYN, 80/267 & UB, 2, 57/267

Dense oak and deodar forests beyond Chakrata and Mussoorie between 5000' to 9,040' (0).

90. *Ophrysia superciliosa* (Gray) : Mountain Quail

FBI, 5, 356/1939; SYN, 83/280 & HB, 2, 73/280

Rare, may even be extinct—last recorded from Mussoorie in 1865, 67, 68 and once near Nainital in 1875.

Present status unknown.

91. *Tragopan melanocephala* (Gray) : Western Tragopan

FBI, 5, 345/1932; SYN, 85/285 & HB, 2, 80/285

'Occurs sparingly in the dense fir forests in the Tons Valley (0).

92. *Lophorus impejanus* (Latham) : Impeyan or Himalayan Monal Pheasant

FBI, 5, 335/1928; SYN, 86/290 & HB, 2, 88/290

Osmaston (1935) recorded it in interior hills between 8000' to 10,000' in summers and comes down to 5,000' in winters. But the species now appears to be rare.

93. *Lophura leucomelana hamiltoni* (Gray) Whitecrested Kalij or Kalij Pheasant

FBI, 5, 320/1918; SYN, 87/293 & HB, 2, 94/293

Fairly common in the Siwaliks, less common in the Himalayan foothills than in the higher Himalayan hill ranges, between 1,000' to 10,000' (0).

94. *Gallus gallus murghi* (Robinson & Kloss) : Red Jungle Fowl

FBI, 5, 295/1903; SYN, 89/299 & HB, 2, 102/299

In Siwaliks but getting scarce, resident of thick scrub jungle; breeding end February to July (W, 57).

95. *Pucrasia macrolopha macrolopha* (Lesson) : Koklas Pheasant

FBI, 5, 310/1911; SYN, 91/305 & HB, 2, 305/113

Beyond Chakrata hills in fir, deodar and oak forests, from 5000' -9,500' (0).

96. *Catreus wallichi* (Hardwicke) : Cheer Pheasant

FBI, 5, 307/1910; SYN, 92/307 & HB, 2, 116/307

Steep rocky or grassy slopes in hills beyond Chakrata from 5000' to 9,000' (0).

97. *Pavo cristatus* (Linn.) : (NATIONAL BIRD) Common Pea Fowl

FBI, 5, 282/1817; SYN, 93/311 & HB, 2, 123/311

Osmaston (1935) observed '.....used to be extremely common in the Dun'; now restricted to Siwaliks from Mohund to Rani Pokhari in South-eastern Dun and in the South-west to Timli. Species is suspected of predating Jungle fowl eggs, check has been suggested experimentally (Bhatnagar and Waltener, 67).

Family—Turnicidae

98. *Turnis sylvatica dussumieri* (Temminck) : Little Bustard Quail
FBI, 5, 450/2003; SYN, 94/313 & HB, 2, 128/313

Dun-waste land in long grass (0); Tons valley—uncommon (W, 49) and resident along Tons valley in scrub jungle (G, 57).

Family – Rallidae

99. *Rallus aquaticus indicus* Blyth : Indian Water Rail
FBI, 6, 4/2006; SYN, 98/328 & HB, 151/328

Swamps near Kansrao and Karwapani—eastern Dun (0) and winter visitant in north (Ripley, 61).

100. *Grus leucogeranus* Pallas : Siberian Great White Crane
SYN, 97/325; HB, 2, 144/325

New forest-May, 55 (G, 57)—identity doubtful.

101. *Rallina euzonoides amaouroptera* (Jerdon) : Banded Crane
FBI, 6, 16/2014; SYN, 99/332 & HB, 2, 155/332

Possible resident, breeds in dense scrub and close ravines in the rainy season and disappears in other seasons (0).

102. *Amaurornis akool akool* (Sykes) : Brown Crane
FBI, 6, 25/2024; SYN, 102/342 & HB, 2, 167/342

Eastern Dun—swampy streamlets of Kansrao and Lacchiwala (0).

103. *Gallinula chloropus incica* Blyth : Indian Moorhen
FBI, 6, 28/2026; SYN, 104/347 & HB, 2, 175/347

Eastern Dun—uncommon around Kansrao and Lacchiwala (0).

104. *Fulicata atra atra* Linn. : Coot
FBI, 6, 34/2029; SYN, 104/350 & HB, 2, 180/350

Uncommon in Dun (0).

Order—Charadriiformes

Family—Jacanidae

105. *Tringa chirugus* (Scopoli) : Pheasant-tailed Jacana
FBI, 6, 42/2032; SYN, 107/358 & HB, 2, 199/358

Uncommonly in jhils and ponds of Dun (0). Now occasionally in pond near Sahaspur, Chakrata Road.

Family—Charadriidae

106. *Vanellus vanellus* (Linn.) : Peewit or Lapwing
FBI, 6, 180/2121; SYN, 110/364 & HB, 2, 210/364

Occasional winter visitant in Dun damp meadow-land (0).

107. *Vanellus cinereus* (Blyth) : Greyheaded Lapwing
 FBI, may be in Vol. 6; SYN, 110/365 & HB, 2, 211/365
 Dun—winters, not common, earliest appearance December and latest appearance January (W, 57).
108. *Vanellus indicus indicus* (Boddaert) : Red-wattled Lapwing
 FBI, 6, 186/2125; SYN, 111/366 & HB, 2, 212/366
 Dun and Siwaliks—cultivable land, grasslands close to streams, fairly common all along (0); Tons valley—resident, breeding March to August (W, 57) and resident in New Forest (G, 57).
109. *Vanellus spinosus duvaucelii* (Lesson) : Spur-winged Lapwing
 FBI, 6, 184/2124; SYN, 111/369 & HB, 2, 216/369
 Fairly common on stony and sandy river beds, islands along the Ganges and Yamuna and also on the larger tributaries (0); Tons valley—one vagrant in October (W, 49) and Dun—uncommonly during winters, earliest appearance October and latest January (W, 57).
110. *Vanellus malabaricus* (Boddaert) : Yellow-wattled Lapwing
 FBI, 6, 190/2123; SYN, 112/370 & HB, 2, 218/370
 Occurrence same as in previous species, in Tons valley—resident but common and breeds in June (W, 57).
111. *Charadrius dubius jerdoni* (Legge) : Indian Ringed Plover
 FBI, 6, 171/2115; SYN, 115/380 & HB, 2, 380/231
 Dun—uncommonly on stoney beds and streams (0); Tons valley—October and November, mainly winter visitant and breeds February and October, (W, 57).
112. *Charadrius alexandrius alexandrius* (Linn.) : Kentish Plover
 FBI, may be in Vol. 6; SYN, 115/381 & HB, 2, 235/381
 Tons valley in winters but not common (W, 57).
113. *Tringa totanus eurhinus* (Oberholser) : Eastern Red shank
 FBI, 6, 221/2147; SYN, 119/394 & HB, 2, 257/394
 Rare winter visitant on Ganges and Yamuna as well on Song and Asan (0).
114. *Tringa nebularia* (Gunnerus) : Green Shank
 FBI, 6, 225/2150; SYN, 120/396 & HB, 2, 269/396
 Dun—along streams and rivers (0).
115. *Tringa ochropus* (Linn.) : Green Sandpiper
 FBI, 6, 215/2143; SYN, 120/397 & HB, 2, 263/397
 Dun—fairly common on ponds and streams (0); Tons valley—vagrant in April, resident July to February, earliest appearance April and New Forest winter visitant.

116. *Tringa glareole* (Linn.) : Wood or Spotted Sandpiper
FBI, may be in Vol. 6; SYN, 120/398; HB, 2, 265/398
Tons valley—winters fairly common, earliest appearance September (W, 57).
117. *Tringa hypoleucos hypoleucos* (Linn.) : Common Sandpiper
FBI, 6, 217/2145; SYN, 121/401 & HB, 2, 271/401
Dun—common along ponds and streams (0); winter visitant, earliest appearance August and latest by April (W, 57) and Tons valley vagrant in March, resident October to January (W, 49).
118. *Capella solitaria solitaria* (Hodgson) . Solitary Snipe
FBI, 6, 257/2169; SYN, 123/404 & HB, 2, 278/404
Uncommon in Chakrata and Deoban hills, generally at 9,000' sub-species in Tons valley—January, 49 (W, 57).
119. *Capella nemoricola* (Hodgson) : Wood Snipe
FBI, 6, 255/2168; SYN, 123/405 & HB, 2, 280/405
Occasional winter visitant on swampy water edges of Dun forests (0).
120. *Capella soonura* (Bonaparte) : Pintail Snipe
FBI, 6, 263/2173; SYN, 123/406 & HB, 2, 282/403
Rare in Dun (0).
121. *Capella gallinago gallinago* (Linn.) : Faintail Snipe
FBI, 6, 259/2170; SYN, 124/409 & HB, 2, 287/409
Dun—common snipe on swamps and streams in winters, earliest appearance in August and latest in November.
122. *Capella mininma* (Brunnich) : Jack Snipe
FBI, 6, 265/2175; SYN, 125/410 & HB, 2, 290/410
Rare in Dun on swamps and streams (0).
123. *Scolopax rusticola rusticola* Linn. : Woodcock
FBI, 6, 252/2167; SYN, 125/411 & HB, 2, 292/411
Chakrata hills between 8000'-10,000', breeds March to September, occasional winter visitant in Dun—damp spots in Kalsi, Karwapani and Lacchiwala (0).
124. *Calidris minutus* (Leisler) : Little Stint
FBI, 6, 234/2155; SYN, 127/416 & HB, 2, 301/416
Occasional winter visitant in mud flats in back waters of Yamuna and Ganges (0).
125. *Calidris temminckii* (Leisler) : Temminck's Stint
FBI, 6, 237/2158; SYN, 127/417 & HB, 2, 303/417
Tons valley in September and October and fairly common in autumn (W, 49).

Family—Rostratulidae

126. *Rostratula benghalensis benghalensis* (Linn.) : Painted Snipe
FBI, 6, 45/2033; SYN, 131/429 & HB, 2, 325/429

Breeding bird of Dun swamps (0); not uncommon winter visitant earliest appearance November and latest mid February (W, 57).

Family—Burhinidae

127. *Burhinus oedipnemos indicus* (Salvadori) : Indian Stone Curlew
FBI, 6, 77/2047; SYN, 134/436 & HB, 3, 2/436

Fairly common in Dun, waste lands, stony and dry grounds (0); resident in New Forest (G, 57) and Tons valley—resident but not very common, breeding in March (W, 57).

Family—Dromadidae

128. *Esacus magnirostris recurvirostris* (Cuvier) : Great Stone Plover
FBI, 6, 80/2049; SYN, 135/437 & HB, 3, 5/437

'...sparingly on the islands in Ganges and Yamuna, stony and sandy islands, vegetation free are preferred' (0); uncommon in Clement Town and FRI area (W ? 57).

Family—Glareolidae

129. *Glareola lactea* (Temminck) : Small Indian Pratincole
FBI, 6, 92/2096; SYN, 137/444 & HB, 3, 15/444

'Common on the sandy, stony islands in Ganges where they breed in company with terns..... frequenting rivers' (0).

Family—Lariidae

130. *Larus ichthyæetus* Pallas : Great Blackheaded Gull
FBI, 6, 101/2060; SYN, 141/453 & HB, 3, 29/453

Infrequent winter visitant on Yamuna (—doubtlessly on Ganges too) (0).

131. *Chlidonias hybrida indica* (Stephens) : Indian Whiskered Tern
FBI, may be in Vol. 6; SYN, 142/458 & HB, 3, 39/458

Uncommon winter visitant (W, 57).

132. *Rhynchops albicollis* Swainson : Indian Skimmer
FBI, 6, 150/2100; SYN, 151/484 & HB, 3, 75/484

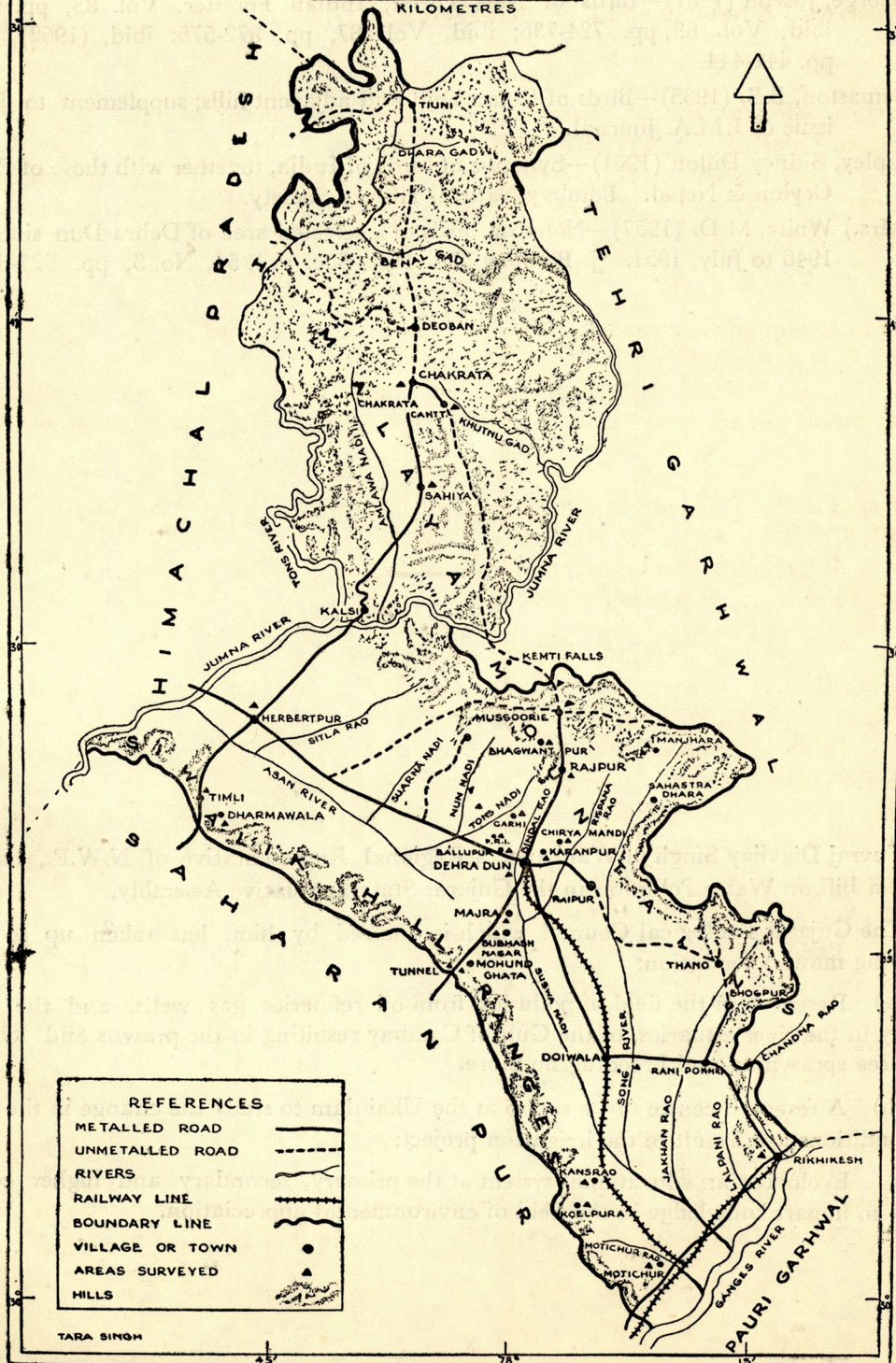
Scarcely seen with terns on Ganges and Yamuna (0).

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MAP OF DISTRICT DEHRA DUN

SCALE
0 2 4 8 16 24
KILOMETRES



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Yuvraj Digvijay Singh of Wankaner a Regional Representative of N.W.F., has introduced a Bill on Water Pollution in the Gujarat State Legislative Assembly.

The Gujarat Ecological Council, which is chaired by him, has taken up so far the following matters for action:

- (a) Research in the field of pollution from oil refineries gas wells, and the fertilizer factory in the river estuaries, of the Gulf of Cambay resulting in the prawns and lobsters of that area sprawling and breeding no more.
- (b) A research centre to be set up at the Ukai dam to study the change in the ecological conditions as a result of the irrigation project:
- c) Evolving an educational system at the primary, secondary and higher education levels to impart knowledge in the field of environmental appreciation.

बारहसिंहा (स्वाम्प डीयर) के सींग

लेखक

हरीप्रकाश अग्रवाल

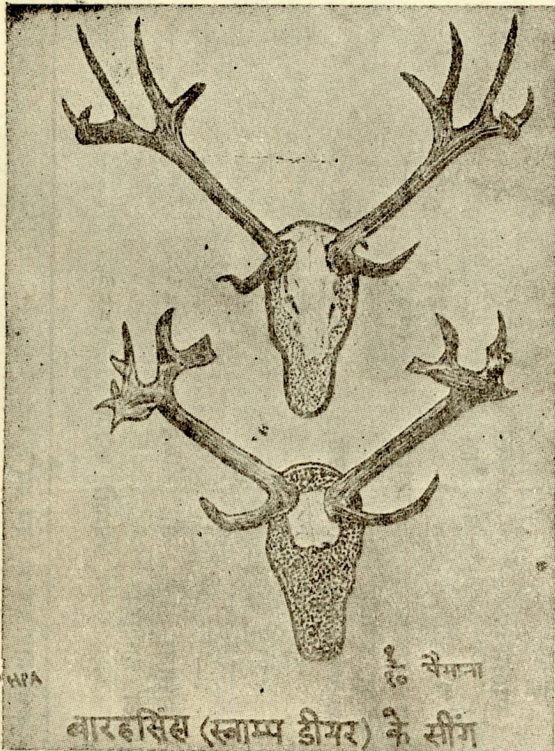
भारत को बन और उसकी उपज पैतृक सम्पत्ति के रूप में प्राप्त है। बन या जंगलों से वानस्पतिक पदार्थ ही उपलब्ध नहीं होते, परन्तु उनमें विचरण या बिहार करने वाले पशु-पक्षी भी सम्मिलित हैं। प्रकृति का मानव से वैसा ही सम्बन्ध है जैसा आत्मा का शरीर से। प्रकृति की छटा और शोभा निहारने योग्य है और वन्य-प्राणी एक अमूल्य निधि है। ये मन लुभावने एवं सुन्दर वन्य-प्राणी हमारे जीवन को उल्लसित ही नहीं करते हैं, अपितु आर्थिक स्थिति की भी उन्नति करते हैं।

लगभग सभी मनुष्यों ने बारहसिंहा (स्वाम्प डीयर) का नाम सुना है, और लोग चिड़ियाघरों, अजायबघरों व जंगलों में इस जानवर को देखने के पश्चात् तुरन्त इसकी ओर आकृष्ट हो जाते हैं। आखिर क्यों? इस प्राणी में ऐसी क्या विचित्रता है? ऐसी कौन सी विशेष सुन्दरता है जिसकी ओर बाल और युवा सभी का मन लालायित होने लगता है? मेरे विचार से इसका उत्तर बहुत सहज व सरल है वह है 'बारहसिंहा के सींग'। इसलिये यह आवश्यक है कि इसके विषय में कुछ ध्यान-पूर्वक विचार किया जाय। यद्यपि यह लेख शिकारियों एवं

प्रकृति-वैज्ञानिकों के लिये अधिक लाभप्रद व उपयोगी है परन्तु मुझे विश्वास है कि चिड़ियाघरों में कार्य करने वाले प्राणी-वैज्ञानिकों के लिये भी कम दिलचस्प नहीं होगा।

बारहसिंहा के सींग के विषय में कुछ जानने या समझने से पहले यह भी ज्ञात होना आवश्यक है कि यह प्राणी कहाँ पाया जाता है? बारहसिंहा (स्वाम्प डीयर) आजकल केवल कुछ ही अलग अलग स्थानों पर पाये जाते हैं। उत्तर प्रदेश में मुख्यतः शारदा नदी के पास पश्चिमी खेरी वन्य खण्ड में और समीप के दक्षिण-पश्चिम नेपाल में पाये जाते हैं। कुछ समूह आसाम व उत्तरी बंगाल में भी देखे गये हैं। मध्यप्रदेश में मंडला जिले के कान्हा राष्ट्रीय उद्यान में भी यह पाये जाते हैं।

बारहसिंहा में सात माह की उम्र में सींग का निकलना प्रारम्भ होता है। प्रारम्भ में यह ललाट की हड्डी पर एक छोटे से उभार के रूप में प्रदर्शित होता है। इसके सींग इस जानवर के नाम की सार्थकता प्रकट करते हैं।



भारतीय चिड़ियाघर, कलकत्ता में रखे गये बारहसिंहा के कुछ सींगों का विवरण इस प्रकार है:—

क्रम संख्या	स्थान	दाता	वर्ष	कपाल की आधारीय लम्बाई	कपाल की चौड़ाई	सींग की लम्बाई	परिधि	अन्दर से अधिकतम चौड़ाई	नोक	सिरे से सिरे तक
१	?	क्रय किया	१८५८	१५.५	४.४	२५.५	५	१७.७५	७×७	१७.७५
२	?	"	"	?	?	२२.२५	४.५	१६.७५	५×५	१७.७५
३	आसाम	एच. बट्चर	१८७६	?	?	२०.७५	४.७५	१८.५	७×६	१३.७५
४	नरबदा	राजा आर. मलिक	१८५०	१०.७५	३.७५	४.२५	२.७५	—	२×२	३.७५
५	?	क्रय किया	१८५८	१४.५	४	१३.५	४.७५	१६.२५	६×५	२३.५
६	?	"	"	?	?	१५.७५	३.५	१२.५	५×६	१०.७५
७	ऊपरी बंगाल	टी. हार्ड विकी	१८२२	?	४.७५	२८.५	५.२५	२०.५	७×६	१४.२५
८	शिलांग, आसाम	क्रय किया	१८७६	?	?	३०.२५	५.३	२०.६	४×४	२२.५
९	?	?	१८५८	?	४.५	३२.५	५.२५	३२.२५	६×६	२८.५
१०	?	?	"	?	?	२४	६.२५	२३.२५	८×७	१६
११	?	?	"	?	?	२७.५	५.२५	२३.७५	७×७	२२.५
१२	?	?	"	?	—	२७.३	५.८	२६.५	१०×८	२२.२५
१३	आसाम	आर. डब्ल्यू जी. फ्रिथ	१८४२	?	४.७५	२७.२५	५.२५	२२.७५	७×७	२०.५
१४	?	?	१८५८	?	?	२७.२५	५.२५	२८.५	१०×१०	२१.४
१५	तेजपुर, आसाम	बट्चर	१८७६	—	?	३०.२५	५.५	२४.५	६×७	१८.७५
१६	लखीमपुर, आसाम	"	"	—	—	२७.७५	४.८	२७.२५	७×७	२०.७५
१७	कलकत्ता	प्राणी उद्यान	१८७७	१५.२५	३.७५	२०.५	४	१७	४×४	२५.२५
१८	—	?	—	—	—	२७.२५	५.२५	—	६	केवल एक सींग
१९	—	?	—	—	—	२४	४.७५	—	५	"
२०	—	?	—	—	—	१८	"	—	५	"
२१	—	?	—	—	—	२१.२५	"	—	५×५	—
२२	सरगूजा (छोटा नागपुर)	जी. कोकबर्न	१८८६	—	—	३५.५	५	—	६×६	—
२३	—	प्राणी उद्यान	१८८३	—	—	१६.७५	४.२५	—	४×४	—

नोट:—सभी माप इंच में लिये गये हैं।

जैसा कि चित्र में दिखाया गया है इसके सींग बहुत ही विलक्षण प्रकार के होते हैं। मादा बारहसिहा के सींग नहीं होते। सींग की औसतन लम्बाई लगभग ७६ सेंटीमीटर होती है, परन्तु प्रमाणित लम्बाई १०४ सेंटीमीटर तक है। मध्यप्रदेश की अपेक्षा तराई वाले भाग में पाये जाने वाले बारहसिहा के सींग अधिक श्वेत व चिकने होते हैं।

डनबर ब्रान्डर (१९२३) ने अपनी पुस्तक में लिखा है कि नर बारहसिहा अप्रैल माह तक अपने सींग नहीं गिराते, और बहुत से बारहसिहों में तो इस मास के अन्त तक भी सींग लगे देखे जाते हैं। परन्तु ई०पी० गी के अनुसार मई मास के दूसरे सप्ताह तक भी नर बारहसिहों में कड़ा सींग रहता है।

आसाम में बारहसिहा की जो भिन्न भिन्न जाति (*Cervus duvauceli branderi*) पाई जाती है, उसके नर बारहसिहा के सींग मार्च, अप्रैल और मई तक भी रहते हैं। इसका कारण यह भी हो सकता है कि भारी वर्षा के फल-स्वरूप माचं से अप्रैल तक घनी घास उग आती है, जिससे उसकी खाद्य स्थिति पर प्रभाव पड़ता है, मध्यभारत में इस प्रकार की खाद्य स्थिति पर जोलाई तक कोई अन्तर नहीं होता।

कभी कभी सींग बिरूषित या विकृत हो जाते हैं, जिसके कारणों पर बहुत से वैज्ञानिकों ने विचार व्यक्त किये हैं। स्टर्नडेल (१८८६), मोरिस (१८९१), रोरिंग (१९०१), क्लार्क (१९१६), मूर (१९३१), डालिंग (१९३७) और बिसलोकी (१९५२) का मत है कि शरीर के किसी भी अंग या हिस्से में चोट या क्षति लगने के कारण सींग में बिरूषिता आ सकती है। परन्तु डिकसन (१९३४) ने इस मत का खण्डन किया, उसके विचारानुसार शरीर की चोट या क्षति का कुछ सींग से कोई सम्बन्ध नहीं है। इस विचार धारा का रोबिनेटी एवं जोन्स (१९५६) ने भी समर्थन किया है। इन दोनों लेखकों या वैज्ञानिकों का अनुमान व विचार है कि सम्भवतः आरम्भ में वृद्धि के समय ही सींग में सीधे कुछ चोट लग जाने के कारण ही सींग विकृत हो जाता है।

एकपाश्विक अण्डोच्छेदन का प्रभाव सींग की वृद्धि पर पेनरोज (१९२४) द्वारा देखा गया; परन्तु ऐसे ही प्रयोगों द्वारा जेकजैस्की (१९५२) ने यह ज्ञात किया कि सींग की सम्मिति आने वाले मौसमों में प्रभावित नहीं हुई। डेरानियागला (१९५३) ने यह लोकप्रिय मत स्वीकार किया कि खारे स्वाद से उत्तेजित होने पर बारहसिहा अपने उगते हुये कोमल सींग को अनायास ही कुतर देता है। परन्तु इस विचारधारा को स्वीकार करना असम्भव है, क्योंकि वैसे भी बहुत से हिरन और बारहसिहों में असामान्य सींग होते हैं। वास्तविक कारण कुछ भी हो, परन्तु उपरोक्त विचारधाराओं के आधार पर यही परिणाम निकाला जा सकता है कि चोट या क्षति की प्रतिक्रिया ही असामान्य या विकृत सींग का कारण है।

प्रकृति में यह देखा गया है कि शक्तिशाली निर्बल का शिकार करता है और दुर्बल चालबाजी एवं छलावरण द्वारा अपनी रक्षा करता है। परन्तु युगों से चला आ रहा यह तरीका विशेष रूप से भोजन प्राप्ति के लिये आवश्यक है। प्रकृति ने सुरक्षा का अधिकार सभी को समान रूप से दिया है और सभी को अपनी रक्षा करने के कुछ न कुछ साधन प्राप्त हैं। सींग भी जन्तु की सुरक्षा और बचाव के लिये एक शस्त्ररूपी महत्वपूर्ण अंग है। परन्तु बारहसिहा तो मादा को प्राप्त करने के लिये भी दूसरे बारहसिहों से भगड़े के समय इसका शस्त्र के रूप में प्रयोग करता है। बारहसिहों के सींग का मानव जीवन में बहुत उपयोग है। आदिकाल में मनुष्य इससे अस्त्र-शस्त्र भी बनाता था। बहुत से मनुष्य इसे घर की सजावट के काम में लाते हैं। इससे बहुत सी आकर्षक वस्तुयें भी तैयार होती हैं। अपितु यही नहीं कुछ औषधियों के लिये भी इसका विशेष महत्व है।

यदि देश में वन्यनिधि की सुरक्षा के भरपूर साधन एकत्रित किये जायें या जुटाये जायें तो यह इस बात का द्योतक है कि देश उन्नति एवं विकास के कगार पर खड़ा है। इसलिये हम सभी का यह परम धर्म व कर्तव्य है कि वन्यनिधि की उपयोगिता व महत्व को समझते हुये उसके संहार या विनाश की सम्भव प्रयत्न द्वारा रक्षा की जाए।

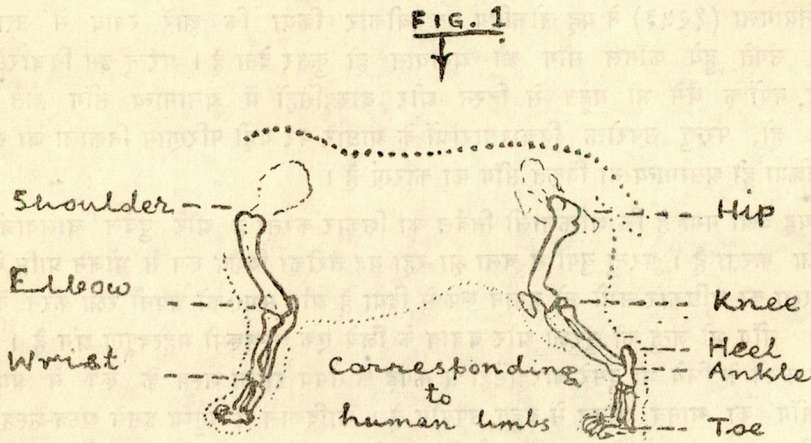
The Tiger Stride

BY

SAROJ RAJ CHOUDHURY

"Which is the longer, the hind or the front leg of the tiger?" The question was put to me by the Deputy Ranger at Sawai Madhopur Sanctuary in Rajasthan. He and the Ranger, Rup Singh, were firm in their belief that because the hind leg was longer in the tiger, its pugmark would always fall in front of the front pugmark. They had arrived at this conclusion after discussion with a supposed authority on tigers who had visited the Sanctuary... appears true, but without insight.

The tiger's hind leg, although longer along the curve, is level in height with the front leg, and hence, his body remains horizontal. The tiger is a tip-toe walker, digitigrade. The bones in the portions of its feet corresponding to the rear half of our palms and feet, are raised above the ground like the foot of a lady on an extra high-heel shoe. In the hind foot of the tiger, this raised portion extends much beyond the ankle joint to form a longish raised heel. This provides a highly efficient fulcrumed lever for the calf muscle. This adaptation is important in predation, for the final spring at the prey. The longer 'S' curve of the hind leg is to get the maximum take-off kick with the toe-ankle-knee joints action. Figure 1 will make this clear.



While walking, the hind legs of the tiger cover the same pace as set by his front legs. Else, just imagine the predicament of the body if the front and the back legs were to set their own different paces? It would result in a drag or squeeze along the length of the body. This may happen only when the tiger is partially disabled in either of its pairs of legs.

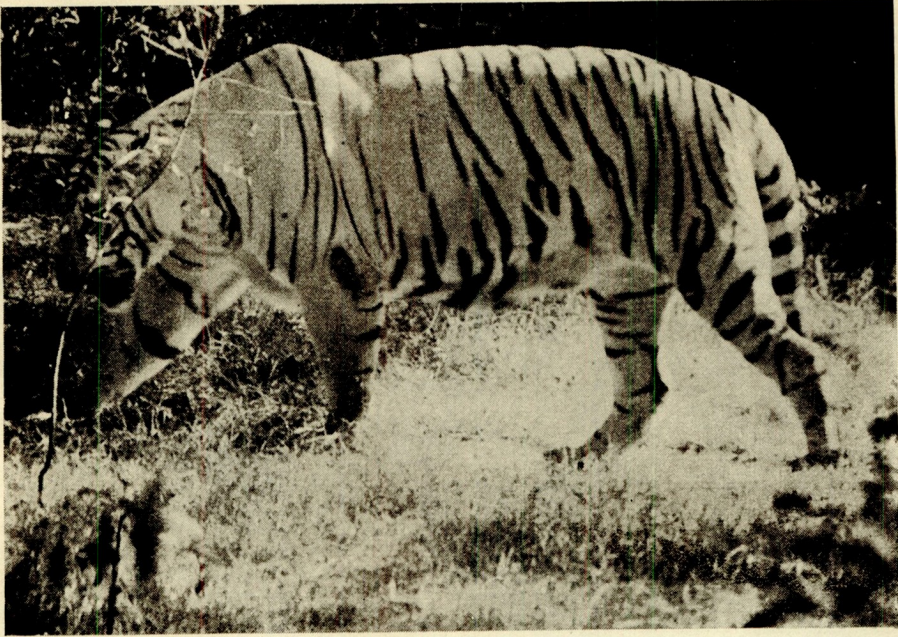


Normal stride



Fast action—long stride

Normal stride.



Photo—S.R. Choudhary.

Female Four-horned antelope.



In a normal stride the tiger's front paw impresses the pace on the ground, and as it is lifted, its back paw of the same side catches up to fall on the impression made by the front paw. With its body moving at normal height, the pace is conveniently half the distance between the back and the front paws. And so, the back paw is placed over the impression of the front paw.

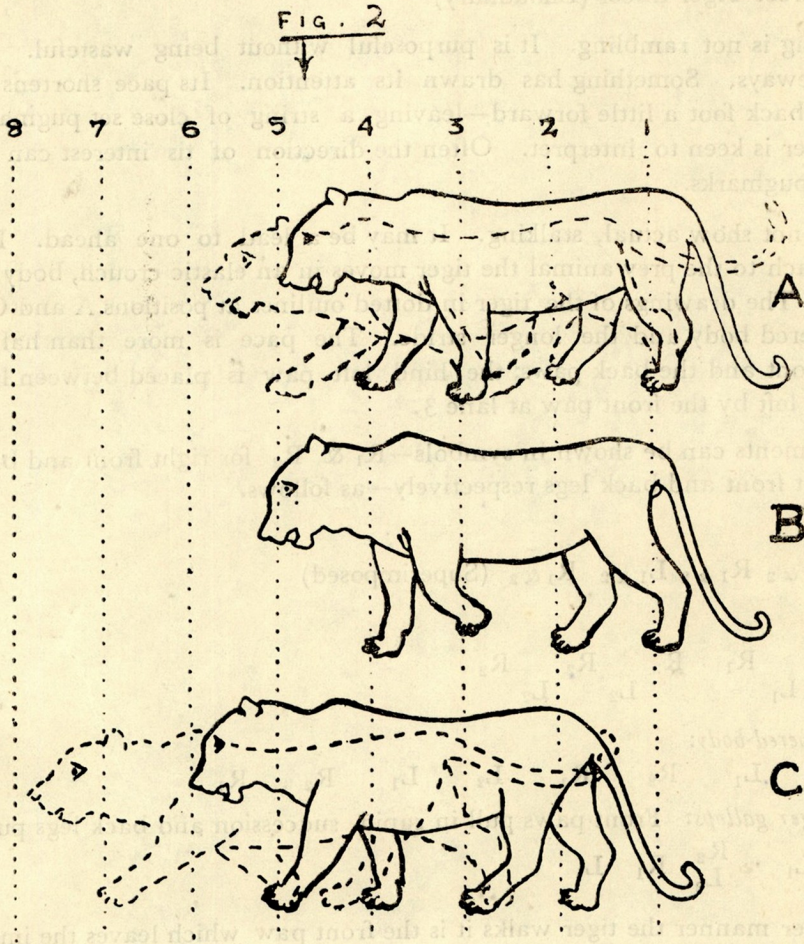


Figure 2 shows three different positions of the body—A, B & C—as it moves through one pace.

- (i) Position A through B to C: the movement of the body is indicated by the tip of the nose from lane 5 to lane 6, one pace.
- (ii) Compare the positions C and A: the left back paw is placed at the spot vacated by the left front paw at lane 3.

(iii) The left front paw jumps lane 4—occupied by the right front paw—to reach lane 5.

The position C after one pace, is the reversed side replica of position A. And thus it goes on alternating in the strides of the tiger ambling in its morning and evening strolls in the open paths and roads in its habitat, avoiding the dew and the spines in the wintry bush... And thus it leaves clear pugmarks of the back paw in a line—like a biped's walk—all for the discreet Tiger-tracer (Choudhury).

Its ambling is not rambling. It is purposeful without being wasteful. Sometimes it may look sideways. Something has drawn its attention. Its pace shortens—front foot a little forward, back foot a little forward—leaving a string of close set pugmarks to tell the story to whoever is keen to interpret. Often the direction of its interest can be cued from the lay of the pugmarks.

This does not show actual, stalking. It may be a lead to one ahead. In its careful stealthy approach to the prey animal the tiger moves in an elastic crouch, body lowered and stride longer. The drawings of the tiger in dotted outlines at positions A and C, in figure 2, shows the lowered body and the longer stride. The pace is more than half the distance between the front and the back paws; the hind left paw is placed between lanes 4 and 5 ahead of mark left by the front paw at lane 3.

The movements can be shown in symbols— R_1 & R_2 for right front and back legs, and L_1 & L_2 for left front and back legs respectively—as follows.

Normal stride:

$R_1 \& 2 \quad L_1 \& 2 \quad R_1 \& 2 \quad L_1 \& 2 \quad R_1 \& 2$ (Superimposed)

Short pacing:

$R_1 \quad R_1 \quad R_1 \quad R_2 \quad R_2 \quad R_2$
 $L_1 \quad L_1 \quad L_2 \quad L_2$

Long stride—lowered body:

$R_1 \quad L_2 \quad L_1 \quad R_2 \quad R_1 \quad L_2 \quad L_1 \quad R_2 \quad R_1$

And when the tiger gallops: Front paws pull in rapid succession and back legs push in unison.

$R_2 \quad R_1 \quad L_1 \quad R_2 \quad R_1 \quad L_1$
 $L_2 \quad L_2$

In whatever manner the tiger walks it is the front paw which leaves the impression first, followed by the back paw. And so, when it is not superimposition, the dust lifted by the back paw—coming later—falls on the front pugmark, often obliterating some of its outlines. It is not difficult here to recognise the back pugmark—clearer and confident—for the use of the Tiger-tracer.

A fortnight after, on March 26, 1971, Rup Singh met me again in Jaipur "You were right sir", he said, "I followed recently the Kachida tiger—over whose pugmarks we had the discussion—on the road for nearly 4 miles. Most of the front and back pugmarks were completely superimposed.

"Thank you", I said, "Not many take such trouble with an open mind. Now you know how confident the Tiger-tracer could be. Give a brushing to the road in the manner we had done with the help of the van. Tie the brush wood, or, better still, a bunch of tough wires vertically down the rear side of the van or jeep—even the contractor's truck returning last from the forest can do this—and let it wipe out all old marks on the road. The pad-impression pad (the road surface) is now ready to take fresh impressions for clearer tracing and differentiation."

Hope they do it!"



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And when the jumbos come...

Jumbo Jets will soon bring past India many thousand more people than have ever come this way.

They will need clean, comfortable accommodation; at least 23,000 more hotel beds are required by 1974. Wholesome, hygienically prepared food, more shops, restaurants, recreation facilities... all these are necessary now. Above all, a smiling, friendly welcome must await our visitors to make their visit a happy one.

What are we doing about it?

The Government is taking an increasingly active part to help build more hotels, improve air and transport services, provide new and better tourist facilities.

But Government effort alone is not enough. Tourism is everybody's business. Because people benefit wherever the tourist travels. Wealth flows from affluent countries to the less affluent, and within the country from the developed areas to the less developed and from the richer strata of society to the less rich. Everyone benefits from tourism.

So, join us in our efforts. Let us give the tourist the amenities he needs and see that he goes home happy. Each happy tourist means so many more will come next year. Shouldn't be too difficult for us. Isn't ours one of the world's oldest traditions in hospitality?

**Welcome a visitor
send back a friend.**

Department of Tourism
Government of India

